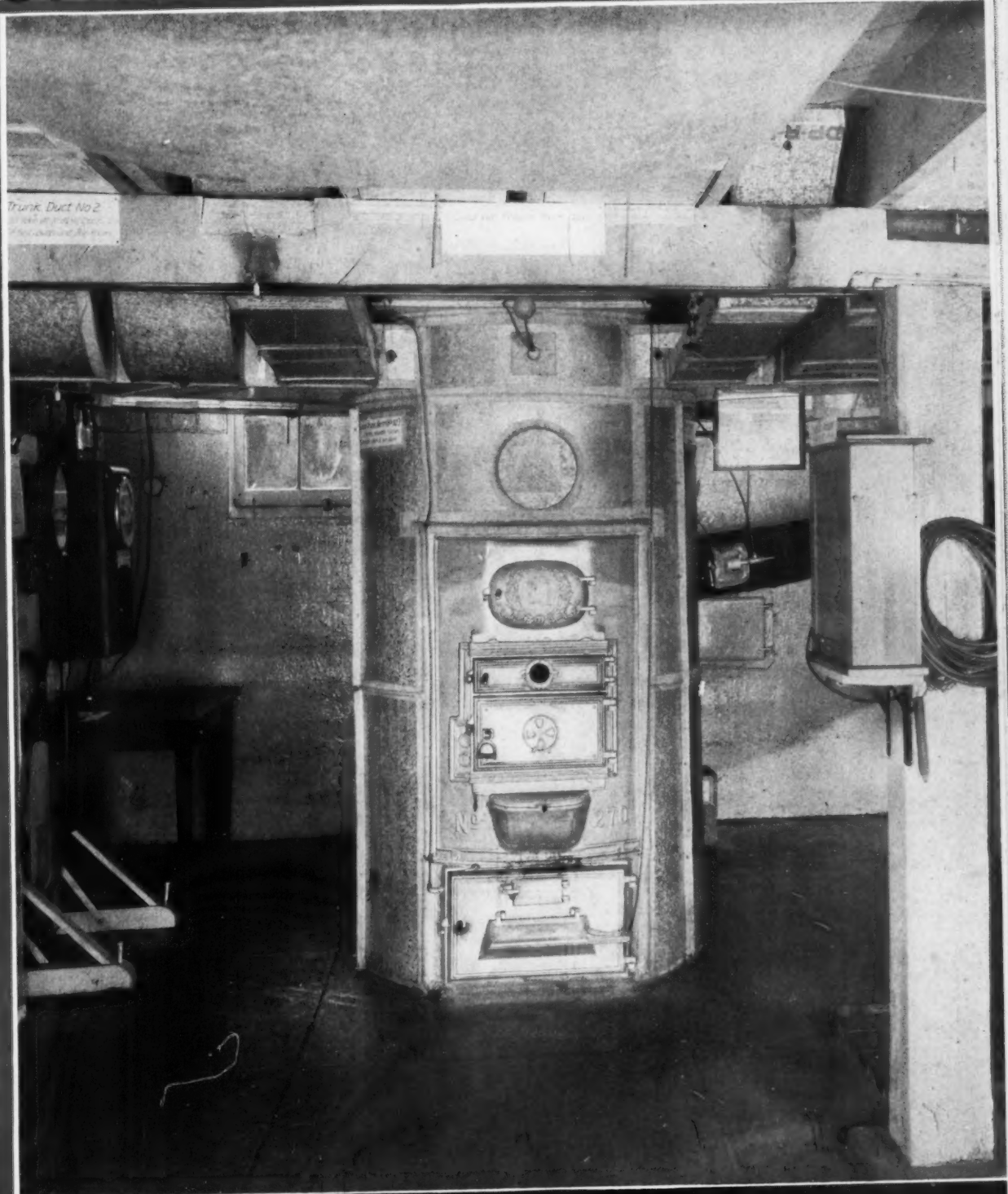


AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



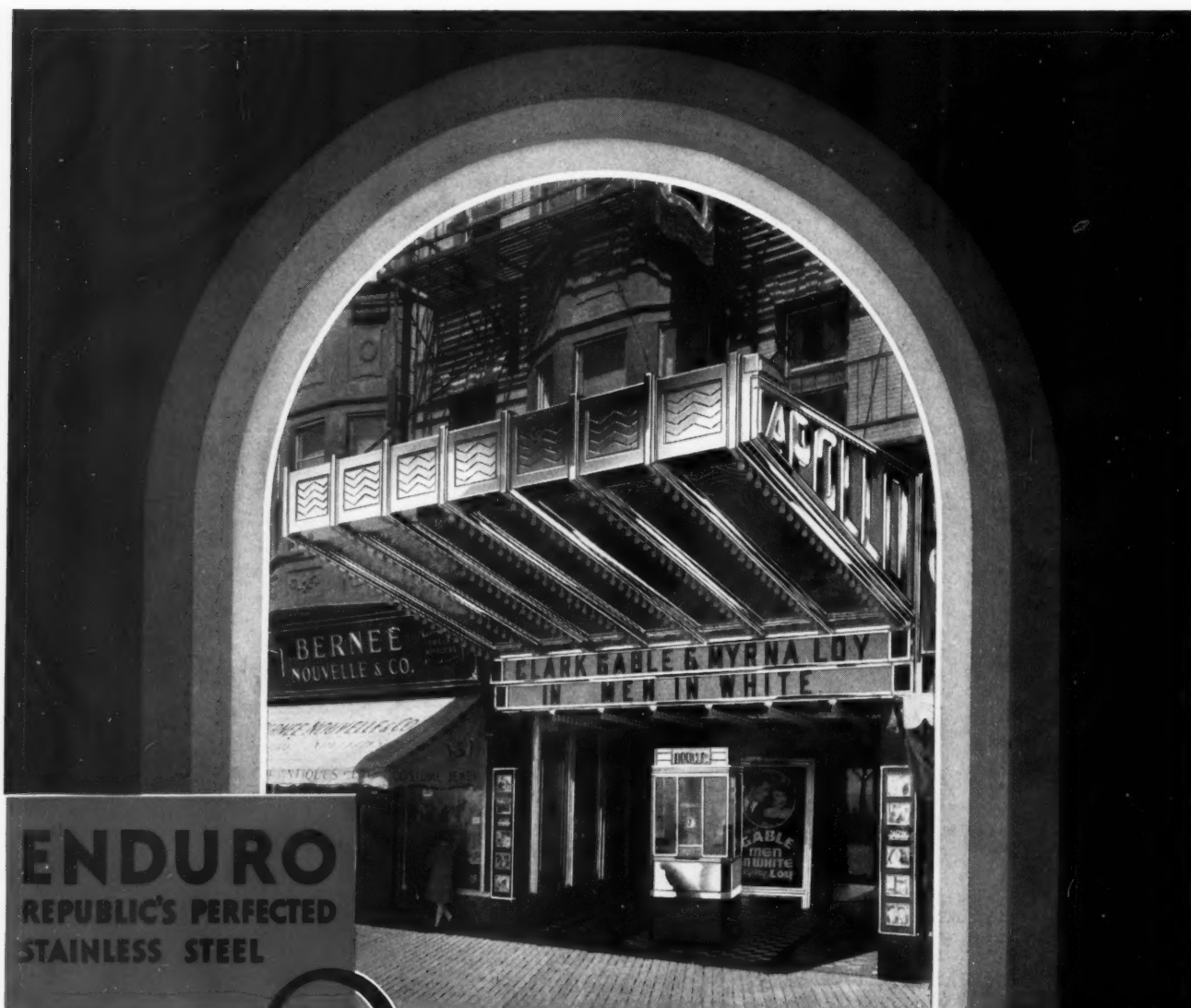
ESTABLISHED
8 8 0

DECEMBER
1934

THE AIR CONDITIONING SECTION

Page 23

AMERICAN ARTISAN



ENDURO
REPUBLIC'S PERFECTED
STAINLESS STEEL

Licensed under Chemical
Foundation Patents Nos.
1316817 and 1339378.

Twelve hundred square feet of ENDURO was fabricated by Joseph H. Josephson to make the new marquee, display frames and cashier's box for the Apollo Theatre, Atlantic City.

O PENS

A NEW AVENUE TO BETTER BUSINESS

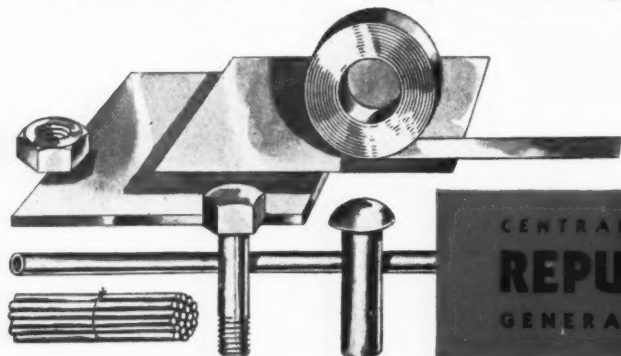
Theatres and stores are coaxing business with new attractive fronts. Housewives are demanding corrosion-resisting stove pipe and bright metal sinks, drainboards and trim. Gasoline service stations are capitalizing the sales value of bright display signs. Hotels and restaurants are covering kitchen work-table tops to insure cleanliness. Industrial plants are finding many places where an unusual metal is needed to combat corrosion.

Sheet metal contractors the country over are finding

it profitable to meet these needs with ENDURO. It affords them a new metal with which to work, and opens up an untold number of new outlets for business.


ENDURO is Republic's Perfected Stainless Steel. It is a lustrous, silvery metal, the same all the way through. It does not rust, tarnish or corrode. Weather has no effect on it. It does not contaminate food. Fruit and meat juices do not mar it. It is easy to clean. Its beauty is unchanging. And, what is of equal importance to you, it is easy to fabricate—to bend, form, punch, weld and solder.

ENDURO is available in all commercial forms, and in a variety of finishes. It is stocked by distributors in practically all large cities. Write for literature.



CENTRAL ALLOY DIVISION . MASSILLON, OHIO

REPUBLIC STEEL CORPORATION

GENERAL OFFICES  YOUNGSTOWN, OHIO

for the first time— Perfectly Controlled! Combustion with COAL

● Why 59 of the 76 furnace manufacturers have
Standardized on The Hold-Heet System

● Why you now have a chance to force sales and
profits never possible before

THE Ordinary "Regulator Set" is not a Combustion Control

A regulator set with a bonnet switch that closes the draft half an hour too late is not combustion control. A regulator set with a hot water limit switch that may take an hour to respond—after enough heat has been stored in the water to overheat the house all day long in mild weather—is not combustion control. Worst of all is the regulator set without any limit switch. Picture what happens on a cold day with the heating plant full of fresh fuel if a window is left open in the room with the Room Thermostat.

A Stack Limit Control is Necessary.

Now this problem has been solved by the addition of the dependable HOLD-HEET Stack Control—instantly sensitive to fire conditions. Perfect combustion control, heretofore limited to oil or gas fires, is now possible with COAL. The fire is always under perfect automatic control—there are no over-runs—no burned out grates or fire pots. Heat energy is released only as required—there is no waste up the stack.

Stack Control, long the theoretical ideal, is now made practicable, accurate, powerful, fool-proof, trouble-proof, and long-lasting by HOLD-HEET. Accepted everywhere as "the last word," 59 of the 76 furnace manufacturers are now using this equipment. HOLD-HEET, the last regulator manufacturer to enter the market, has already passed the other 22. You, too, should standardize on this dependable combustion control.

HERE is Expert Opinion. "I have installed one of these controls, and it surely is the greatest improvement in automatic coal controls in recent years. It has held the heat in the house where installed as evenly as if oil or gas were being burned. This is something I have never found before, and I have installed a great many controls. After the thermostat calls for heat, I notice that the stack limit control will close the draft three or four times until the thermostat is satisfied." W. A. Rummel, Weir Furnace Distributor, Mishawaka and South Bend, Ind.


TODAY'S Great Opportunity.

for the heating man is offered in the HOLD-HEET 4-Unit Plan of Complete Winter Air Conditioning. Makes Air Conditioning practicable for every home. Easy-to-buy, a-unit-at-a-time. You can profitably install HOLD-HEET complete Winter Air Conditioning—Units 1, 2 and 3—in any ordinary furnace heated home for \$195.00. Start with The HOLD-HEET System. Add Automatic Humidity, Air Circulation, Air Filtering and Summer Cooling. There are fortunes for live dealers in this HOLD-HEET opportunity.


Catalogue No. PU15P. The Hold-Heet System \$17⁷⁰
(Thermostat, Damper Motor, Transformer and STACK CONTROL, as pictured, plus Accessories) Dealer's price

Catalogue No. PU15. Hold-Heet Regulator \$12⁷⁰
(Same as above, less Stack Control) Dealer's price....
For the Incurable Price Buyer—and for use with slow burning (Hard) coal where ordinary "Regulator" will serve.

DAMPER MOTOR



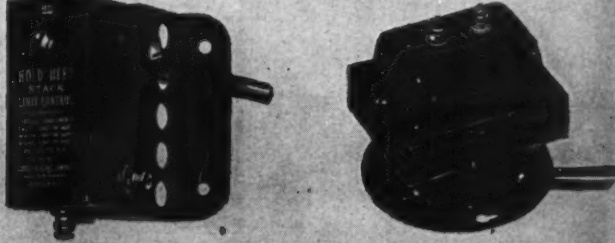
ROOM THERMOSTAT



STACK LIMIT CONTROL



TRANSFORMER



The **NEW HOLD-HEET System**
Regulates Any Domestic Furnace or Boiler

Get the FACTS

Hold-Heet is giving full co-operation where it is most valuable to you—12 2-color pages describing Hold-Heet Controls and Equipment (in SWEETS Architectural Catalog) will be on every Architect's, leading Contractor's and Builder's desk within the next month. Send in the coupon today.

FREE Use the Coupon

RUSSELL ELECTRIC CO., CHICAGO

"No Risk" Guarantee

HOLD-HEET Controls and Air Conditioning Equipment are manufactured and offered for sale as the finest equipment built. They are GUARANTEED to be superior in construction and performance to any similar equipment on the market, regardless of price.

Any HOLD-HEET UNIT may be ordered and returned if, IN YOUR OPINION after test it does not prove to be superior to any similar product built, and the full purchase price and transportation costs will be immediately refunded.

Russell Electric Company, Mfrs.,
342 West Huron Street, Chicago, Ill.

Pin this Coupon
to your
Letterhead

() Send full information, Free
() Send a Hold-Heet System with Stack Control
() Send a Hold-Heet Regulator

Firm name

Address

City..... State.....

Send thru (Jobber)

() Check or money orders enclosed. () Ship C. O. D. Rated firms will be shipped on open account.

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Ventilating
Roofing



Published Monthly by
Keeney Publishing Company
6 North Michigan Ave., Chicago
State 6916

Branch Offices
New York
Room 1735
Grand Central Terminal Bldg.
Murray Hill 2-8293

Cleveland
2047 Rossmoor Rd.
Cleveland Hts.
Yellowstone 1540

J. D. WILDER
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Keeney Publishing Company

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Member of Audit Bureau of Circulation
Member Associated Business Papers
Inc.

Yearly Subscription Price — Anywhere in
the world, \$2.00; Single Copies, \$25. Back
numbers \$50. Entered as second-class
matter, July 29, 1932, at the Post Office at
Chicago, Illinois under the act of March 3,
1879.

AMERICAN ARTISAN

With which is merged

**FURNACES
AND
SHEET METALS**

AND

**Warm-Air
Heating**

Vol. 103, No. 12

December, 1934

Founded 1880

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More than 7,000 copies of this issue are being distributed.

You can get
MORE JOBS
if you sell
WELL-KNOWN
MATERIALS

•

THIS established fact applies in all lines of business. The product marked with a well and favorably known name, other conditions being equal, is *much easier to sell!*

For that basic reason, many successful contractors insist on *Anaconda* Copper. For it is known to more people than any other brand, and is generally accepted as the standard of sheet metal quality.

You can make your selling job easier by pushing trademarked *Anaconda* Copper. At the same time, you can increase your reputation for quality and dependability. The public has learned that sheet metal work of *lasting copper* is the most economical over a period of time.

Anaconda Copper is readily available. Sheet metal supply houses throughout the country carry this accepted brand in sheets and rolls, also copper gutters, leaders, elbows and shoes trademarked ANACONDA.



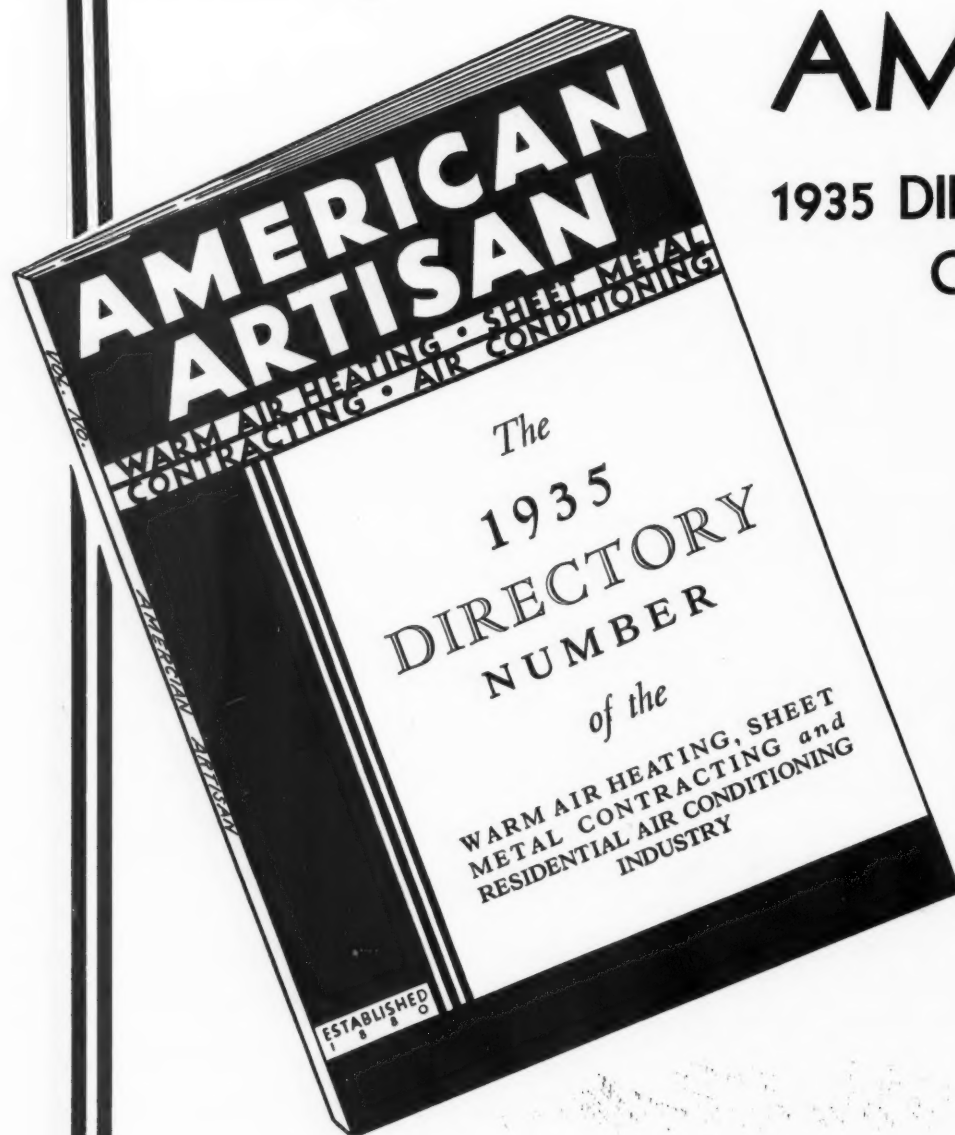
THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut

ANACONDA COPPER

ANACONDA
TRADE MARK FOR SHEET METAL



Watch for . . .



AMERICAN

1935 DIRECTORY NUMBER
CONTRACTING and
JANUARY

Now being pre-
pared . . . In the
hands of more
than 7,000
buyers

January 15

**COMPLETELY REVISED AND BROUGHT UP TO
DATE . . . NEW FEATURES ADDED**

More than ever the opportunity of the year for the manufacturer to establish or re-establish his line with the key factors of the warm air heating, sheet metal contracting and residential air conditioning industry . . . to insure attention and consideration of his products at the all-important times of specification and purchase. . . .

Over 7,000 distribution to the real buying power of the industry . . . contractors, dealers, wholesalers and manufacturers.

ESTABLISHED — KEPT — USED

ARTISAN'S

of the WARM AIR HEATING, SHEET METAL RESIDENTIAL AIR CONDITIONING INDUSTRY 1935 ISSUE

AMERICAN ARTISAN'S Annual Directory Number now needs no introduction. It is the regular January issue each year and has become the indispensable reference guide for contractors, dealers, jobbers and manufacturers in the warm air heating, sheet metal contracting and residential air conditioning field. Complete and accurate, it answers the ever-present questions of "Who makes it?" and "Where are they located?" Between its two covers, the buyer can quickly, conveniently and confidently find all sources of supply for any product or device used in the field. It is the most popular, most helpful and the only thing of its kind published in the industry.

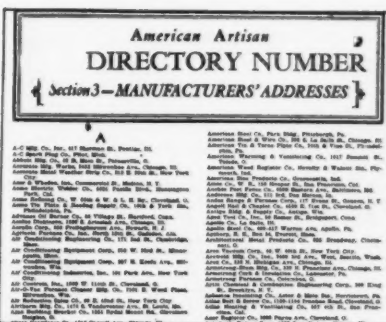
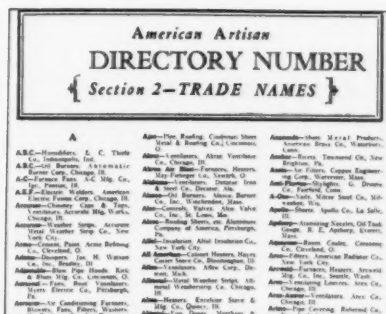
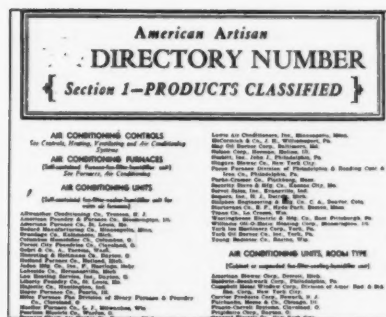
For that reason, it is an ideal advertising medium for the manufacturer. With a complete showing of his line of products in the advertising pages, together with his complete listing in the Directory Section, the manufacturer gets all the advantages of representation in an issue which is eagerly greeted by buyers when it arrives and thoroughly used throughout the year. His story is there to be seen at a time when contractors, dealers and wholesalers are deliberately looking for a product to buy or specify.

Advertisers will be given every attention-winning advantage with their names starred wherever they appear throughout the Directory, indicating that their advertisements can be found in this issue. Capitalize on that by having your copy cover every item under which you will be listed.

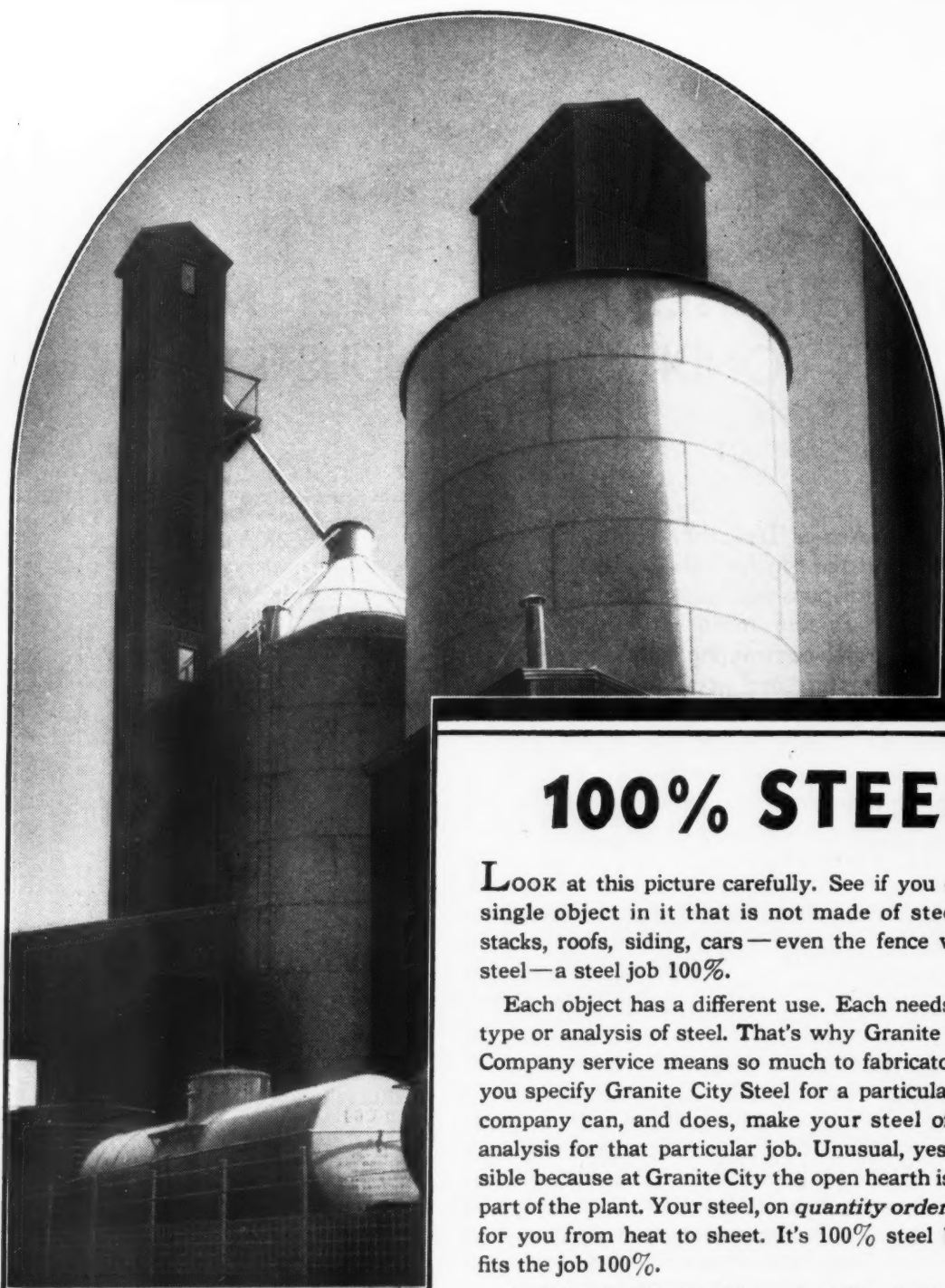
★ ★

**MAKE YOUR
RESERVATION NOW!**

THROUGHOUT THE YEAR



More than 60 pages, listing close to 300 products, 1,000 trade names, 1,200 manufacturers' addresses . . . the most valuable buying service ever offered the industry . . . completely re-checked and brought up to date for 1935 use.



100% STEEL

Look at this picture carefully. See if you can find a single object in it that is not made of steel. Tanks, stacks, roofs, siding, cars — even the fence wire — are steel — a steel job 100%.

Each object has a different use. Each needs a special type or analysis of steel. That's why Granite City Steel Company service means so much to fabricators. When you specify Granite City Steel for a particular job, this company can, and does, make your steel of a proper analysis for that particular job. Unusual, yes, but possible because at Granite City the open hearth is a definite part of the plant. Your steel, on *quantity orders*, is made for you from heat to sheet. It's 100% steel because it fits the job 100%.

And Granite City Steel is made at Granite City, Illinois, only 15 minutes from St. Louis, served by 29 railroads and the Mississippi River — better service to the Mississippi Valley, the West and the Southwest.

GALVANIZED SHEETS
STEEL SHEETS
PLATES AND
TIN PLATE



GRANITE CITY STEEL CO

GRANITE CITY, ILLINOIS
5719 Ellsworth Ave., Dallas
916 Walnut Street, Kansas City

1805 Boatmen's Bank Bldg., St. Louis
1613 Pioneer Building, St. Paul
1502 Mariner Tower, Milwaukee
110 South Dearborn Street, Chicago

HELP YOURSELF TO SOME

FOOD JOBS

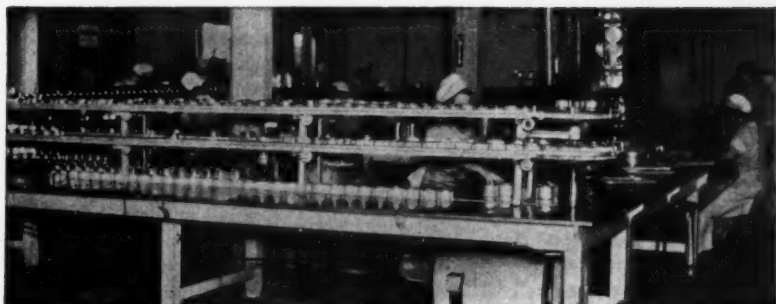
The canner, preserver and meat packer are all big users of Monel Metal... show them you can turn out equipment they need



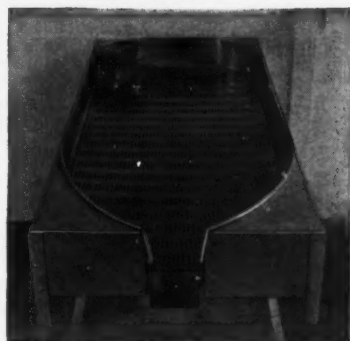
(Above) A live California contractor landed the order for these fruit juice extractor tables. He recommended Monel Metal because it resists the action of fruit acids. That's a point to remember when you talk to makers of preserves, jellies, or other foodstuffs.



(Right) An Ohio contractor got the order for this batch of scale pans. He proved that Monel Metal resists corrosion and contamination in food handling.



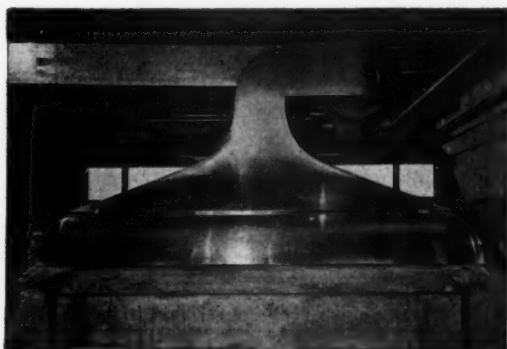
(Above) Evidence that Monel Metal withstands meat packing conditions helped a Seattle (Wash.) sheet metal shop to land this job—Monel Metal-covered tables and shelves in a chicken cannery. We supply you with printed matter you can show your prospects.



(Right) A Baltimore contractor explained to an oyster packer that Monel Metal can't rust even in salt water, and so he landed an order for this oyster skimmer and pusher. A good job.



(Above) The oyster and fish packing industry offers chances to land many profitable jobs like these oyster washers. Ask for literature you can use with owners of similar plants.



(Left) Don't forget the bakeries, cracker, cookie and candy manufacturers: they need equipment that is easy to clean, and buy a lot of Monel Metal. This oven-hood job was landed by a contractor in Schenectady, New York.

THESE photos show the kind of jobs you can get if you go after orders from food packers. First, read up a little on the kind of Monel Metal equipment they use. Then drop around at their factories and tell them that you turn out that kind of work. Do you want to land their jobs? We will send you, free, working instructions and detailed lists of the equipment they buy. That makes your part even easier. Write.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York, N. Y.



Monel Metal is a registered trademark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.



Monel Metal

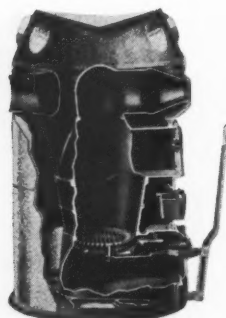


"We've sold 45.. SUNBEAM FURNACES

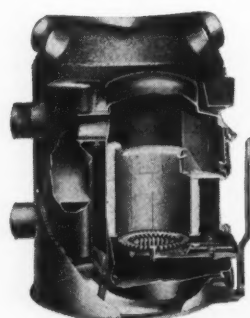


S. B. Koidonov, Manager Fayette Furnace Co.
Uniontown, Pennsylvania

through Sunbeam Finance Plan in connection with F. H. A."



An interior view of Sunbeam Cast Iron Furnace.



An interior view of Sunbeam Steel Furnace.

SUNBEAM FINANCE PLAN FEATURES

- 1 You need not take the prospective buyer to a bank. The Form, applying for the loan, can be filled out right at home.
- 2 You are supplied with special, simplified Sunbeam Forms which are easy for the home owner to fill out.
- 3 Payment is made directly to you and not to the home owner.
- 4 Transactions are passed on in more than a score of strategically located cities. There is not the delay that is experienced when they must be handled at a single, distant point.
- 5 You can offer the prospect any size or type of furnace or air conditioner that he needs or wants—and for any fuel, coal, oil, or gas.

SUNBEAM

WARM-AIR FURNACES

THE FOX FURNACE COMPANY
ELYRIA, OHIO

A Division of
AMERICAN RADIATOR & STANDARD SANITARY CORP.

"THE depression is ancient history to us," reports S. B. Koidonov who operates the Fayette Furnace Company of Uniontown, Penna. "Since August 20th, when the Sunbeam Finance Plan in connection with Federal Housing Administration was announced, until November 30th, a little more than 3 months, our organization has sold 45 Sunbeam Furnaces and Air Conditioning Units. In addition, we have sold more than 30 jobs for cash!

"Prices have been good. Profits have been satisfactory, much higher than before the announcement of the financing provisions of Federal Housing Administration.

"On a cash sale you cannot sell a \$250.00 installation when the buyer has only \$200.00! Under the Sunbeam Finance Plan, buyers think in terms of monthly payments. If they can pay \$10.00 a month, they can be persuaded to pay this for 25 months almost as easily as they will pay it for 20 months.

"The Sunbeam Finance Plan in connection with Federal Housing Administration—(1) with no down payment; (2) lowest financing rates in history; (3) one to three years to pay; (4) no financial statement from the dealer; (5) no holdback of part of money; (6) notes endorsed *without* recourse—has proven to me that selling furnaces is a pretty good business after all."

The necessary amount of selling effort and initiative in combination with Sunbeam equipment and selling helps, will in our opinion, enable any progressive and intelligent furnace dealer to approach the successful and profitable record of the Fayette Furnace Company. Return the coupon below for complete information.

The Fox Furnace Company
Elyria, Ohio

Please send us complete information about the Sunbeam Finance Plan—the complete line of Sunbeam Furnaces and Air Conditioning Units—and the name of the Sunbeam Jobber who serves our territory.

Name

Address

City and StateA-12

THE FOX FURNACE COMPANY DOES NOT SELL TO MAIL ORDER HOUSES

Volume 103

Number 12



AMERICAN ARTISAN

Down to Bedrock

The time has come, we think, for the industry to get down to bedrock in its thinking on this proposition of a code of fair competition. Up to now we have been following an unbeaten path—a path without guide posts or precedent—with our ultimate goal a rosy Utopia wherein every man gets his just share of business at a fair profit without any of the ills which we have been shouting about during the last fifty years.

When NRA launched its program of organization of all industry for the purpose of stamping out of each industry every evil which beset it, we soon found ourselves in a welter of codes beyond imagination. The most preposterous of industries loudly demanded individual and separate codes of self government. Real industries and imaginary industries vied with one another for the honor of being among the first to have approved a code of self government. The result was that at the end of the first year several hundred codes were in operation with an alarming percentage of them involved in arguments which seemed likely to destroy the whole experiment.

As might be expected those industries with real problems and a real need for a code were **not among the first** to get a code into operation. The construction industry was among those important few. The ills of the construction industry are not imaginary. Our ills are so very real that months were required to get the evils out into the sunlight for study. Many more months were and will be required to study these evils and work out a solution.

In all seriousness it should be said that right now the construction industry, as a whole and as component parts with individual problems, has only now begun to find answers for the problems which must be worked out.

Up to now we have been looking at this code proposition as a national problem. We have been thinking of administrative committees as national, state-group or state bodies, each with power of administration over a wide area. We have been studying labor problems in terms of general agreements with national or state labor bodies so that by one signature all the labor problems of a large territory would be settled. We have been thinking of rules of fair practice in general terms—throwing the problems of the big city and small

town into a common pot. We have been organizing our regulatory committees for areas as large as one state and wondering why the committee cannot function.

The time has now come for us to get a true perspective.

So far as we can see, a code for the warm air heating, sheet metal and roofing industry will be a national proposition **in name only**.

The place where any code will function to advantage is right down in a single town or county.

Any labor agreement which is workable can apply only in a single town or county because labor scales, labor supply, labors' quality are not alike more than twenty-five miles from home.

No administrative committee, which expects to do a real job can hope to cover more than one town, one county, or in rural areas a very few counties.

No administrative committee can enforce or police regulations in more than a local area with any degree of economy, efficiency or satisfaction to the trade.

No set of rules of fair trade practice are worth a lead nickel in any community but the one for which they were drawn up.

The measures sorely needed in the big town are just waste paper in the little town nearby.

We believe that the industry should about face and begin organization for code compliance in the local area. We believe that local committees, local regulations, local policing, local labor agreements, are the things we need now.

So far as we can see the operation of our code as a nationwide proposition is something for the future. When all is said and done most communities are not interested in nor concerned with code matters outside their own area.

Most of the arguments which are now rocking our industry arose because we have been trying to do something overnight which will probably take years to accomplish. We are battling over matters which we do not fully understand and our lack of understanding is due to the fact that these matters are national problems—not local problems.

Most codes and most industries are in much the same situation. The only industries which have been able to make nationwide compliance practicable are those industries where there are only a very few members. Our industry has tens of thousands of members. The only way our industry can get satisfactory results is to reduce problems to small-group propositions. And that means local areas.

The thing we want is a set of rules which will prescribe fair trade practices in our area—we do not care what goes on in the next state. We want some plan of policing and enforcement which is workable in our county or town, at a nominal cost, which gets results efficiently and speedily. We want a local plan for handling bids, for keeping recalcitrants in line, for making a profit—and these are **local**, not national problems.

As strong and vital local organizations are effected, cooperation will spread from area to area. Eventually we will have state wide or national compliance, but such should come **from the bottom**, not from the top, if we want a solid, lasting, practical, profitable code of fair competition.

A Cloth Filtering Separator For Very Fine Dust

The removal of very fine dust has long been a problem with blow pipe and collecting systems engineers and contractors. One of our readers encountered real difficulty with alfalfa meal and asked for suggestions. The author of this article, suggesting a solution, is well known for his many years of work in teaching and practical engineering in industrial applications of handling materials.

By John W. Baybutt

Instructor, Rochester Athenaeum and
Mechanics Institute

MANY tricks have been resorted to in the effort to remove the very fine dust from air, particularly where the dust has any value. A large number of cyclone-type dust separators have been rebuilt and extra gadgets added to improve separation, but for real efficiency in dust removal the writer has always resorted to some form of cloth filtering material.

For Existing System

Where a separator now exists an installation similar to that shown in Fig. 1 is simple and economical to make. The outlet ell or pipe from the existing separator is removed and a sheet metal plenum chamber installed in place as shown. The height of the plenum is of course determined by the amount of air to be handled which in turn depends on the size of the separator. The cloth filter material can be sewn up into bags as shown in Fig. 3 and 3A, and metal collars made as shown in Fig. 2. A standard 30-inch width cloth can be used which would require only one seam for a 9-inch diameter bag.

The number and length of bags is again of course dependent on amount of air handled. A canvas strap with slide buckle makes an effective tie band for the bags. The top of the bags can be held by means of canvas eyes sewed on the bags and connected to metal hooks located in the ceiling of the room or on cross bars. Light weight springs have sometimes been used for the top support seemingly to increase agitation to shake down the dust after the air flow stops. Some manufacturers use rapping devices to remove this thick matting of dust which gradually forms after extended operation. This thick matting, of course, increases the filtering efficiency although the resistance to air flow also increases, tending to upset the remainder of the system.

If space does not permit an installation as in Fig. 1, an alternate installation as shown in Fig. 4 can be resorted to. The bag house can be metal or all wood construction, depending on local conditions in regard to fire hazard, cost of materials, etc.

The type of cloth material to be used depends on the product to be

handled, of course. In the case noted, alfalfa meal, I feel very confident that a heavy canton flannel will be satisfactory and in case one thickness is not entirely effective, I know that two bags, one inside the other, will do the trick if the system is installed as outlined below.

Air Volumes

For actual number of bags and other corresponding dimensions, let us take a typical example. Assume a 12-inch diameter air pipe discharging into a separator about 60 inches in diameter with the other dimensions corresponding, according to recommended practice. Roughly 3,000 c.f.m. of air would be handled by such a system. I would recommend a velocity through the filter material of about 10 f.p.m. This would require 300 square feet of surface or 120 linear feet of 9-inch diameter bags. Assuming a 6-foot long bag then 20 bags will be required as shown in plan Fig. 5. The space necessary would be about 4 feet by 5 feet. The height of the plenum chamber for this amount could be 18 inches, but to facilitate maintenance about 24 inches

would be the minimum recommended.

It may be well to note that in addition to the savings of material recovered, an extra benefit will result if this air is blown back into the room, especially during heating periods. Some states require lower air velocities than noted through the filter material

if the air is to be recirculated. The extra power required in the fan system under the conditions outlined would be on the basis of about $\frac{3}{4}$ -inch water static pressure maximum additional. In some systems it may be necessary to speed up the fan, but I would test out before making any fan speed as in many cases this addi-

tional pressure would not seriously affect the system.

The maintenance on this type of system would consist of changing the bags say once a year or better yet when the resistance builds up to 1 inch static pressure on the water gage. The bags could be vacuum cleaned or washed and then used again.

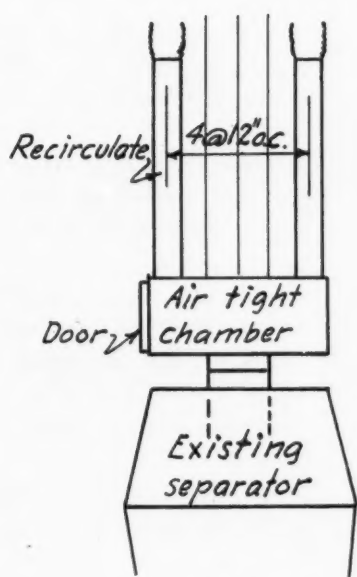


Fig. 1

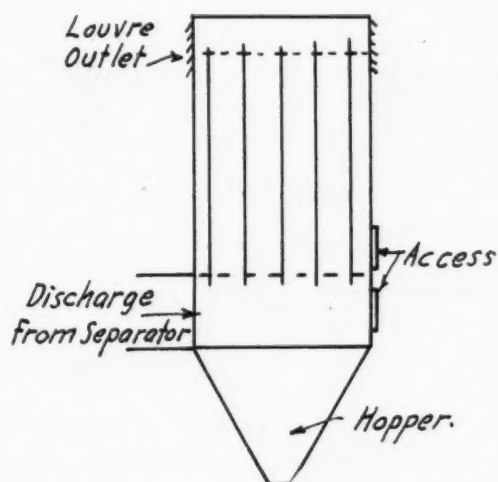


Fig. 4

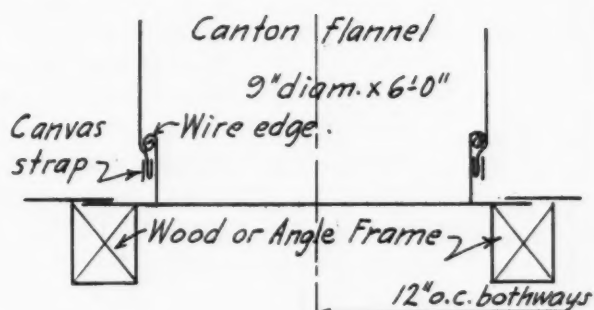
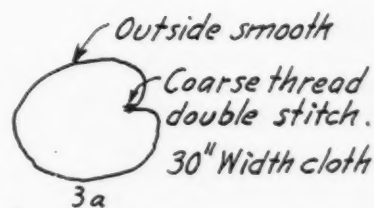


Fig. 2



3a

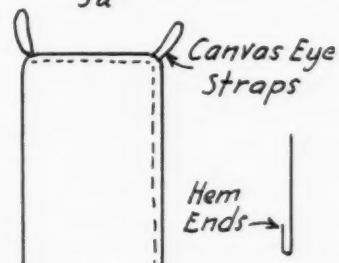
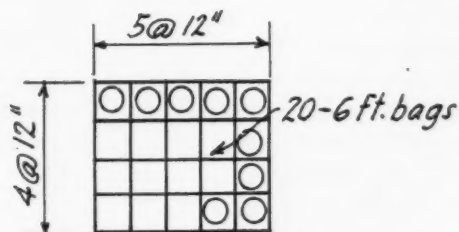


Fig. 3



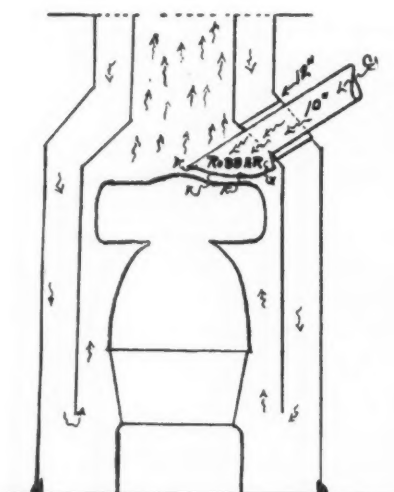
Plan

Fig. 5

Developing a Heat Robber by Trial and Error

By Frank E. Anderson

THE heat robber problem, which we discussed in several issues last year, is so periodically interesting that we again present some ideas on the subject taken from a subscriber's letter.



#1 FAILED

This is the robber Mr. Anderson first used and which did not supply any heat to the troublesome room. Note the special collar he built for use in case the robber didn't work

This letter comes from Frank E. Anderson, well known throughout the Middle West as a heating man of wide and varied experience. His letter reads as follows:

"There has been so much written recently in your valuable trade journal relative to long leaders and leaders from pipeless furnaces, many suggestions (both good and bad) showing how to overcome the trouble frequently encountered in these runs, that the writer is tempted to 'cut in' also with a suggestion and a citation of some actual experience along this line.

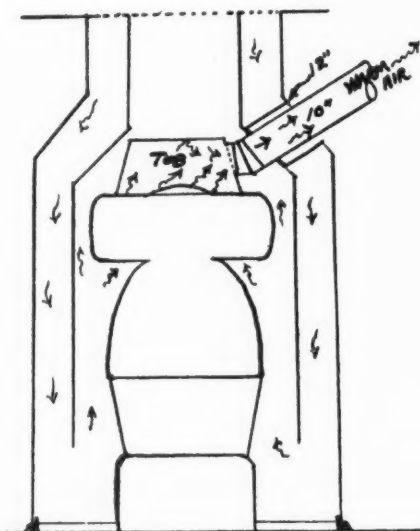
"Along about 1914, the writer, while traveling for a manufacturer, superintended the installation of a pipeless furnace in a large residence at Rich Hill, Missouri.

"This job was guaranteed to heat

two floors as well as an exposed bathroom on the north side of the house.

"At first thought it appeared a very simple matter, due to interior arrangement of the house and the fact that a double stack could easily be run direct to the bottom of the register box in the bathroom, using a leader probably 5 ft. long.

"Before the leader was installed the writer had a hunch that we might experience some trouble on



#2 WORKED

An old tub was made into a robber in this trial, with the pipe cut in as shown here. This worked the best of all the gravity types. The tub fits tight on the radiator

the bathroom run, and therefore decided to take extra precaution in its installation. So between the inner and outer casing a 12-in. collar was dovetailed in place, then a large 'robber' fitting set close to the top of the heater was connected solidly to the inner casing to which our leader was connected in an airtight manner. This leader was then run through the center of the 12-in. collar which was designed to keep the cold air in the cold air section

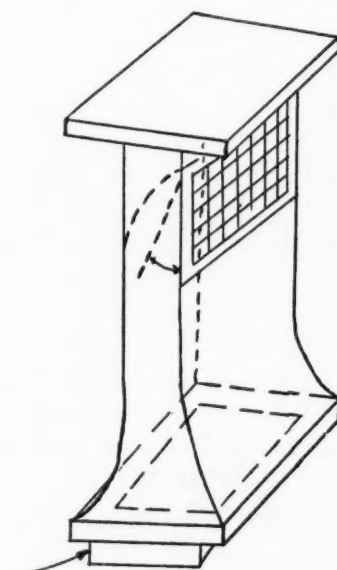
of the pipeless casing from chilling the warm air leader.

"The installation was carefully completed, fire started, and, lo and behold, there was a very strong current of cold air going down the bathroom register and leader.

"Now consider, floor register in bathroom, double stack, direct from center of floor box to basement, transition boot, not to exceed 6 ft. of leader, insulating collar through cold air section of casing, then large robber fitting close to heater—and it failed.

"This and numerous other experiences proves to the writer that many of the illustrated theories along this line will prove very unsatisfactory to the dealers who try them.

"Now for the cure. Cut No. 2 is self-explanatory. The tub which



FLANGE TO FIT IN
FLOOR BOX

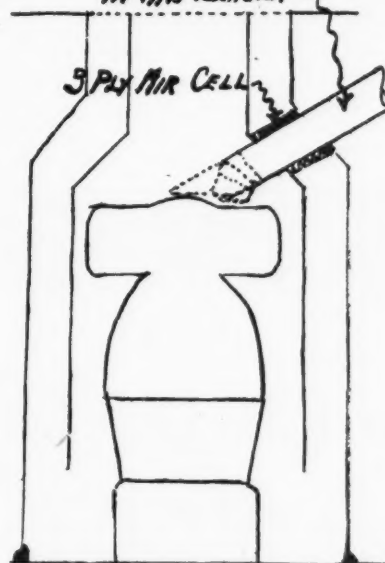
This special register was developed to keep the face above the cold air strata next to the floor. It can be used, of course, only when it can be placed in a corner or against the wall

we found in an alley was used as a makeshift to experiment on, since at that time we had no valuable suggestions applicable from our trade journals, nor did some of our old heads offer a feasible solution for some time afterward.

"In more recent practice most dealers are familiar with the cone shaped 'diffuser,' one of which was installed in place of the tub as soon as we were convinced of its adaptability, but the writer most heartily agrees with a number of your contributors in the fact that the 'diffuser' or robber must fit close to the radiator, as a $\frac{1}{4}$ - or $\frac{1}{2}$ -in. opening at the bottom frequently causes a reversed air current.

"Now, it is quite evident that a diffuser so placed will soon be the cause of the replacement of the most expensive part of the heater, that is, the radiator. Then, when we consider the expense of prop-

INSTALL MECHANICAL CIRCULATOR IN THIS LEADER



#3 BETTER STILL

Here we have number three which worked best of all, not because the robber is better, but because an electric booster fan was installed in the run

erly applying in this makeshift, and the cost of applying any one of the trim little mechanical circulators, why should one ask another solution.

"The writer's only interest is in improved methods, and not in the sale of these devices. However, cut No. 3 shows two simple methods of connecting a leader to the casing ready for any one of the different mechanical circulators adapted to single leaders, on either pipeless or pipe job heating systems.

"The end of the leader in the heat chamber may either be trimmed or have an angle attached; the air cell insulation is easily moved into place if outer casing is cut $2\frac{1}{4}$ -in. larger in diameter than the leader. Leader should be sealed air-tight to inner heat chamber. These precautions are advisable to facilitate air delivery on gravity circulation."

A Round Top Range Canopy By W. R. HAINES,

THE plan and side views of the canopy are first drawn. Then divide the base (*side view*) into equal sections and project those sections on the curved line shown by the points 1, 2, 3, 4, 5, 6, 7, 8, 9 in the side view. Next lay out the *front view* of the curved surface by the projection of these points in the usual manner from the other two views.

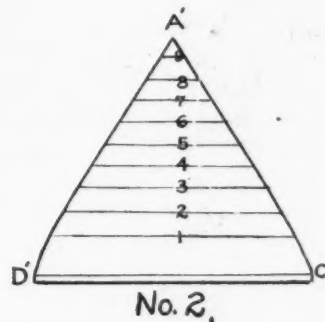
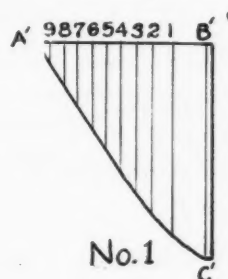
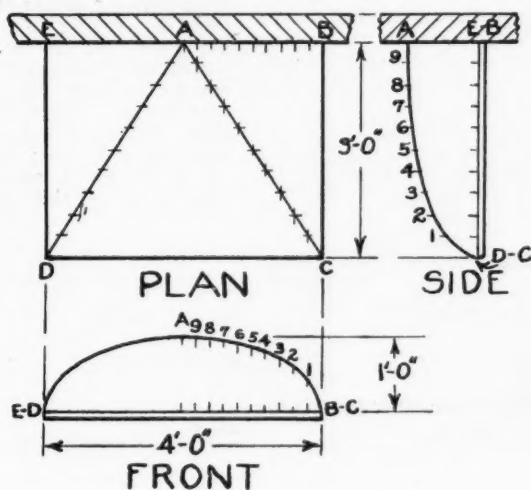
The length of the line $A'B'$ of pattern No. 1 is equal to the length of the curve from point A to point $B-C$ in the front view. The length of the line $B'C'$ is equal to the line

$B-C$. The distance of point I from point B' is equal to the length of the curved line from point I to point $B-C$ in the front view. The length of the line passing through point I parallel to the line $B'C'$ is equal to the distance between the projections of point I on the lines $A-C$ and $A-B$ in the plan view. The remainder of the pattern is laid out in the same manner. This pattern serves for both sides $A-C-B$ and $A-D-E$ of the canopy.

Pattern No. 2 is that of section $A-C-D$. The pattern line $D'C'$ is equal to the line $D-C$. The height

of point A' above the line $D'C'$ is equal to the length of the curve from point A to point $D-C$ in the side view. The height of pattern line I above the line $D'C'$ is equal to the length of the curve from point I to point $D-C$ in the side view. The length of the pattern line I is equal to the distance between the projections of point I on to the lines $A-C$ and $A-D$ in the plan view. The remainder of the pattern lines are laid out in the same manner.

The front view of the canopy can be used as a pattern for the back.



RANGE CANOPY

O
P
E
N

DISCUSSION

Readers are invited to contribute their experiences or suggestions to the topics under discussion or to submit problems on which they wish discussion. Sketches showing your ideas are desired.

Return Air Runs Thru Joist Spaces

IN the new houses going up today and in many of the re-modeled jobs now on the books the problem of how to handle return air runs which pass between joists often comes up.

These return air runs may be between the first and second floor of a house or more frequently in the basement where the owner specifies a plastered ceiling. We want to use the space between the joists; we may not want to fabricate a complete duct section; and we wish to make the path the air flows just as frictionless as possible.

If we skimp the job we may content ourselves by putting a

sheet of iron across the joist bottoms above the lath and box in the end where we want to connect with the pipe drop. If we are a little more careful we will line the under side of the floor above and the inside surface of the joists with building paper.

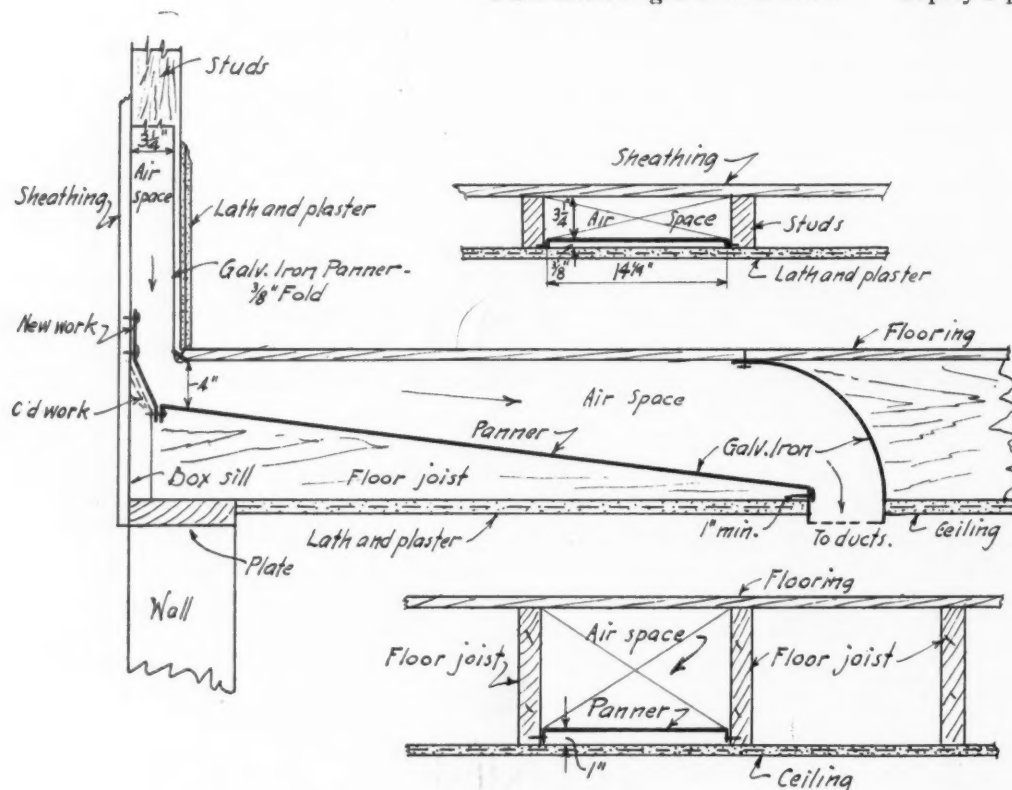
In keeping with the advances made in handling air there should be some better method of getting easy flow of air in such spaces. One suggestion for such an improved method comes from M. S. Tapley, Lincoln, Nebraska, who submits a sketch of a method he specifies and for which he claims high efficiency at low fabricating and installing cost. Mr. Tapley says:

"I am enclosing a sketch show-

ing the application of joist and studding lining which I specify. This plan eliminates resistance along the plaster key side, also dirt and fire hazard. Further, it allows a chance to vacuum clean the inside.

"I believe that this method comes pretty close to offering a suitable conveyor for the return air. I wonder if others have used this plan or what your readers think of it?

We invite readers to submit sketches and information on plans which they use. If you have reason to believe your method is especially good, tell us why. You are also invited to discuss the relative merits and faults of Mr. Tapley's plan.



This drawing shows the plan of carrying return air runs out of wall spaces and through the space between joists. The author claims the plan is economical of material and labor and gives an easily accessible area for cleaning.



Fluxes For Soft Soldering

By Paul E. Demmler

M. & P. Engineering, East Pittsburgh
Westinghouse Electric & Mfg. Company

THE joining of metals by means of another metal or an alloy having a lower melting point, is a process which has been known for many years. The operation is called "soft soldering," or simply soldering, when a low melting material, such as a tin-lead alloy, is used for making the joint. Brazing is the name ordinarily applied when a higher melting alloy, such as brass, is used. The term soldering is sometimes rather loosely applied, since brazing is frequently referred to as "hard soldering," and a brass containing silver is called "silver solder."

Purpose of Fluxes

In almost all cases of soldering or brazing, a flux must be used to

get a satisfactory joint between the metals being united and the solder, or brazing alloy. The flux serves three purposes: first, to remove oxide from the surface of the metal so that the solder can unite with the metal; second, to protect the clean metal from oxidation until the solder is applied; and, third, to assist in the flow of the molten solder over the surface of the metal. These conditions are common to fluxes used in soldering or brazing, but this article will be limited to a discussion of fluxes for soft soldering, that is, for soldering with alloys which may be applied by means of a heated piece of copper, commonly called a "soldering iron."

Soft solders are used for copper, tin, lead, zinc, brass, bronze

and other materials of similar nature. Silver, gold and platinum are among the metals which can readily be soft soldered, but their uses and value are such that soft solder is used with them in exceptional cases only, as, for instance, in the soldering of base metals to glass or porcelain where a film of rare metal is applied before soldering. The usual fluxes may be used in the above cases. The soldering of aluminum and aluminum alloys requires special soldering alloys and special fluxes, the discussion of which will not be taken up here.

Composition of Fluxes

A consideration of the purposes of fluxes indicates that a flux must be acidic in its nature, or

must liberate acid when heated, so that it may dissolve the oxide film and keep the metal clean. Soldering fluxes have been compounded of a great number of materials, and many different formulas have been proposed, but in practically every case, the essential ingredient of a commercial flux will be found to be zinc chloride, or ammonium chloride, or rosin. Some fluxes contain several of these ingredients.

Experiments have been made on the use of another class of fluxes, which includes certain halogenated hydrocarbons. These are organic compounds which contain chlorine or bromine in combined form, and which liberate acid when heated. Some fluxes of this type have appeared on the market under trade names, and, while it has been found that they may be used as fluxes under certain conditions, they are not as effective as fluxes containing zinc chloride or ammonium chloride, nor are they as generally applicable.

The particular form of flux which is to be used, will depend upon the application, and to some extent upon the opinion of the person doing the soldering. Rosin, zinc chloride, or ammonium chloride may be used in solid form, but it is usually much more convenient to prepare the fluxes in paste or liquid form. The following sections contain a number of simple and satisfactory formulas, from which it will be possible to select fluxes suitable for practically all kinds of soft soldering.

Rosin Fluxes

FORMULA 1

Rosin2-6 pounds
Alcohol 1 gallon

Rosin fluxes are non-corrosive because rosin is a weak organic acid which does not attack the metals being soldered. It will not remove any appreciable amount of oxide, hence the metal must be clean before applying the flux and

soldering. Rosin finds its greatest application in soldering electrical connections where corrosion of the wires is to be avoided, and where the insulation might be injured by other fluxes.

Zinc Chloride and Ammonium Chloride Fluxes

FORMULA 2

Metallic Zinc1 lb.
Hydrochloric Acid3 lbs.

After there is no further action, dilute with water to a specific gravity of 1.10-1.12.

FORMULA 3

Zinc Chloride1 lb.
Water1 gallon

FORMULA 4

Commercial zinc chloride solution diluted with water to a specific gravity of 1.10-1.12.

The ordinary "soldering acid" which has been used by tinsmiths and other artisans for many years, is usually made by dissolving zinc in hydrochloric acid (Formula 2). The reaction between zinc and acid is rather violent, and there is considerable fuming and spattering. Since "soldering acid" is really only a solution of zinc chloride, it is much more convenient to prepare this flux by dissolving zinc chloride in water (Formula 3), or by diluting concentrated zinc chloride solutions with water (Formula 4).

FORMULA 5

Zinc Chloride.....1 lb.
Ammonium Chloride.2 oz.
Water1 gallon

Ammonium chloride, commonly called sal ammoniac, is itself a flux, and is frequently used with zinc chloride in soldering fluxes to increase their effectiveness.

FORMULA 6

Zinc Chloride.....1 lb.
Glycerine1 quart
Water1 gallon

On certain classes of work where the work may stand around for hours before soldering after the flux has been applied,

some persons use the above formula. The addition of glycerine is said to prevent the drying of the flux, but the advantages are rather questionable because zinc chloride itself is hygroscopic. Glycerine adds to the cost and may carbonize when the hot soldering iron is applied.

FORMULA 7

Zinc Chloride2¼ lbs.
Ammonium Chloride ¼ lb.
Petrolatum7½ lbs.

This is a strong, concentrated flux intended for use instead of the zinc chloride solutions listed above, in places where a flux in paste form is desired.

FORMULA 8

Ammonium Chloride..¼ lb.
Petrolatum10 lbs.

FORMULA 9

Ammonium Chloride..¼ lb.
Glycerine10 lbs.

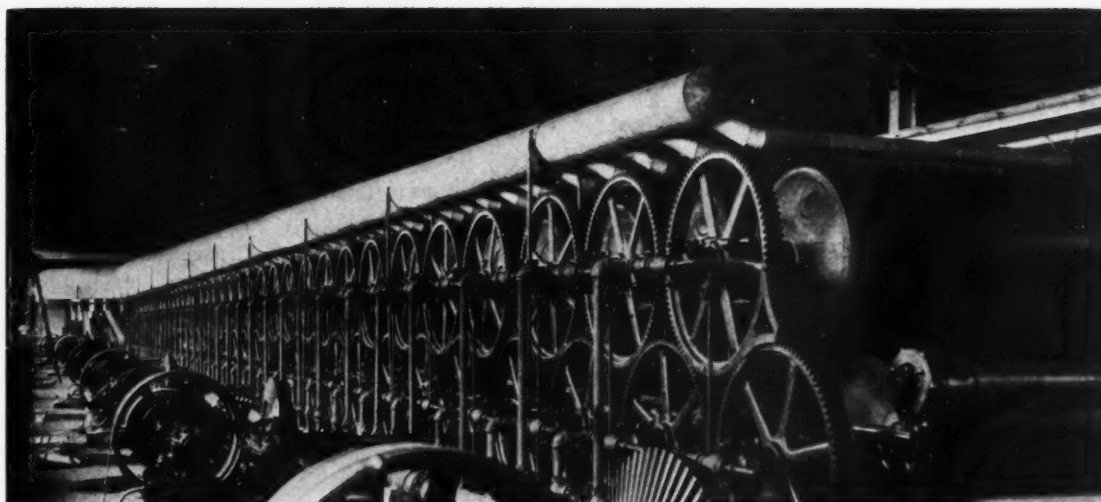
These formulas cover a paste and a liquid flux which are milder than the zinc chloride fluxes listed above, but which will be found to be suitable in many cases.

Attention is called to the fact that organic matter, such as rosin, glycerine or petrolatum, will carbonize if overheated, hence care must be exercised to avoid excessive heat when fluxes containing organic materials are used. A carbonized flux might prevent a satisfactory soldered joint, and necessitate cleaning and reflexing the job.

Corrosive Fluxes

Fluxes containing zinc chloride or ammonium chloride are more effective than rosin fluxes for general soldering, but the nature of the fluxes containing zinc chloride or ammonium chloride is corrosive, and experience has shown that corrosion is to be expected where these fluxes are used unless the flux is removed after the soldering has been completed. In

(Continued on page 59)



This photograph of the collecting system shows the tapered main pipe, the uniform diameter pipe at the back and the duct which carries the collecting system through the floor. Note the slotted openings on the branch pipes over the rollers.

A Vapor Collecting System for Paper Making

THE photographs shown on this page illustrate two phases of an interesting contract completed a few months ago by J. Dersher, sheet metal and roofing contractor of Toledo, Ohio.

The job was installed on a new building of the Consolidated Paper Company at Monroe, Michigan.

The inside photograph shows a collecting duct system over a long battery of paper rolls. As shown there is a round branch pipe over each roll. Each such pipe has long, narrow slots through which moisture and

fumes are drawn. At the collecting end, each branch has an elbow which is cut into the main duct at a slant in the direction of air flow.

The main duct is tapered most of its length. At the small end (foreground of the photograph) the duct is 12 inches in diameter. At the rear the duct is 52 inches in diameter. The tapered pipe is 152 feet long.

At the end of the tapered pipe the 52-inch round pipe is continued as a uniform section for an additional 60 feet and is then

dropped down through the floor as a square duct of the same cross sectional area.

On the outside of the building the Dersher Company placed ten 54-inch ventilators and bases. These are round, storm-band ventilators cut through the ridge of the roof. The ventilators are used for heat and fume removal.

The contract also included the application of a built-up roof on the building and the fabrication and erection of gutters, conductor pipe and sumps. A few additional ventilators were placed on an adjoining, old building.

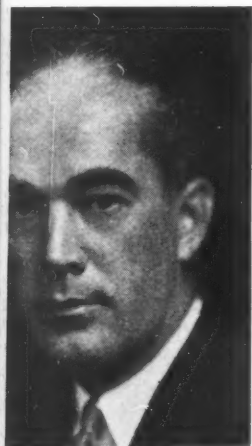


The building is ventilated by this row of storm band-type ventilators, cut through the ridge of the roof.

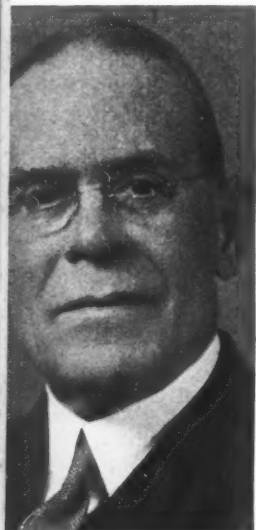
The Annual Warm Air Convention



H. T. Richardson
President



L. R. Taylor
Second Vice-President



Allen W. Williams
Managing Director



D. M. Dobbins
Director, One Year

THE annual meeting of the National Warm Air Heating and Air Conditioning Association, held December 5 and 6 in Pittsburgh, emphasized the changes which have been brought about in the manufacturing side of the industry by NRA and the codes of fair competition. More manufacturers were represented; fewer salesmen and more chief executives came to thrash out the problems brought to the fore by the codes.

Many of these problems relating to trade practices were handled in group meetings on the fourth; the two open meetings on the fifth and sixth clearly indicated the prominence given to subjects and problems which received little consideration in past years.

The convention as a whole reflected a spirit of optimism; manufacturers reporting about 35 per cent increased volume this year, while contractors reported the best fall business in the past five years. Without having any authentic figures to prove the statement, it would seem that a 100,000-unit furnace year is in the making. Practically all manufacturers of specialties and accessories likewise reported a much better volume of business and a more optimistic outlook on the part of the trade in general.

The address of welcome to Pittsburgh was given by W. C. Markle, Secretary of the National Association of Sheet Metal Contractors, who remarked that just ten years ago this year he, as President of the same association, had dedicated the Research Residence in Urbana and that he could not refrain from commendation on the vast amount of practical information which has come from this research effort in these ten years.

President Richardson, in presenting one of the best President's addresses heard in any convention, reviewed some of the year's accomplishments and brought out in sharp focus some of the problems which have either been solved or are in process of solution. Excerpts from this address are presented on another page.

F. H. A. Talk

The always interesting legislation known as F. H. A. found a remarkably interesting commentator in Ex-Governor H. H. Eberhardt of Minnesota; now one of the board of governors of F. H. A. Mr. Eberhardt with a refreshing wit and fund of stories put the audience in a pleasant frame of mind and used these same stories to present some "unmentioned sidelights on F. H. A.," to use his expression.

Mr. Eberhardt's humanitarianism was indicated by his reference to his program of building better schools for the children of Minnesota during his term in office and by his allying F. H. A.'s aims with those principles of fellowship which, as he said, "makes each and every one of us responsible for the happiness and welfare of all our brothers."

Mr. Eberhardt said that F. H. A. was either now doing or was well on its way to do the following things: Every day now two million dollars of loans are going through F. H. A. This means that every day some 5,000 men and women are being taken off of relief and being given self-supporting work. More than one-half million dollars' worth of the goods of our industries are every day going into remodeling work. Many millions of dollars additional are being spent every week where no loans are made.

While the speaker said he

recognized the instinct of every business man to get his share of this work and this money, he besought his audience to view this proposition in larger focus—to appreciate that one of the very real needs of the country was establishment and maintenance of better homes. Better homes mean better children; better environment; reduction of young folks' migration from home; less crime; more real home life and contentment.

According to Mr. Eberhardt's calculations the country needs some 200,000 new homes every year for the next ten years. Such a construction program would permanently employ 4 million mechanics. The launching of the new home construction program is now a matter of daily expectation, the speaker stated, and this program, once launched, will be continued until profitable times return or until all home construction needs are satisfied.

Forced Air Design

The design of forced air and air conditioning systems as we do such work today was the subject of an address by J. Earle Maynard, Chief Engineer, The Fox Furnace Company. Mr. Maynard stated that just because a man can swing c.f.m., B.t.u., relative humidity, etc., such is no proof that the man actually knows what the terms mean and that engineering goes beyond the theoretical and encompasses the practical problems of design.

The speaker based his discussion, accordingly, on a number of practical phases of air conditioning. For example, heat loss must not only account for loss through walls and windows, but also for loss through ceilings, floors, the loss caused by infiltration, etc. Too few designers, declared the

speaker, give infiltration its real importance. When we know that infiltration may cause as many as two air changes per hour, we must take this tremendous heat loss into account.

The relationship between register air temperature and c.f.m. is not appreciated as it should be, was another declaration. The lower the register air temperature the larger the quantities of air required. And the larger the quantities of air moved (in the average installation) the more likely is the occurrence of drafts. The higher the register air temperature the less the c.f.m. and accordingly the less likely the occurrence of draft. Mr. Maynard recommended 400-foot velocities in main runs in small houses and 800 feet in mains in large houses; register air velocities of from 250 to 300 feet per minute for baseboard and floor locations and from 450 to 500 feet per minute for high side-wall locations.

Inlets and Outlets

The speaker reviewed some of the information on types and locations of registers determined by the University of Illinois such as high side wall shows tendency toward stratification; the excellence of high sidewall for cooling. For cities in the northern zone the registers should be located to favor heating; and vice versa in the south. Mr. Maynard recommended putting a blanket of warm air over large glass and cold wall areas, either by a carrying stream from a register opposite or by a slow stream from outside wall registers.

Where a single return is used in a second floor hall, the speaker recommended placing this return as far from the head of the stairs as possible, otherwise the cold air stream is likely to "jump" the return and take the easier path down the stairs. A case where such a cold air stream was broken up by placing a warm air register in a riser half way down the stairs was cited. High side wall regis-

ters in bath rooms was heartily recommended; also use of vents in bath rooms where possible.

Several months ago the association appointed a technical educational committee whose purpose was to make a study of ways and means of getting warm air heating information to the dealer. J. H. Van Alsbury, chairman, reported that a new short course will be held by Michigan State College, East Lansing, Michigan, the last week in February. An outline of the course and the method to be followed was reported together with preliminary information on a plan to establish a speakers bureau which will furnish speakers for state and local association meetings and group gatherings.

In the afternoon Beverly S. King, Deputy Administrator, NRA, presented some highlights of the problems confronting the manufacturers in their code and the dealers and jobbers in their relations to their code problems. More detailed information is given on page 63. A. W. Wrieden, reported on the progress made in the furnace manufacturers code and compliance under the code. R. W. Blanchard reported that the register manufacturers code was working out in splendid fashion.

Effect of Cold Walls

The Effect of Cold Walls on the Feeling of Comfort was discussed by F. C. Houghten of the A. S. H. & V. E. laboratory. This important study emphasized the importance of raising inside temperatures as outside temperatures drop in order that radiant heat from the body will not be increased to a point where a sense of discomfort is experienced when the thermostat says 70 degrees in the room.

Manufacturers present at the session received reports from the committee on "Credits," "Membership," "Trade Relations," and "Public Information," from L. B. Murphy, R. W. Blanchard, F. E. Mehrings and A. F. Frazee, through the secretary.

As has been customary for sev-

eral years the morning session of the second day was given over to research reports. F. G. Sedgwick, chairman of the Research Advisory Committee, reviewed the research accomplishments to date and presented a survey of the research program of recent months.

Professor A. P. Kratz altered his usual discussion and presented with slides some of the practical problems which must be solved in designing forced air heating systems. He began with the problem of designing rectangular duct systems so that each register will deliver its designed volume of air. How resistance occurs in transitions, elbows, straight runs of pipe and the difficulty of correctly sizing ducts to meet these changes in the pipe was brought out with reference to the piping system in the Research Residence. A later report will be published on these points.

Ducts and Bonnets

The results with various types of bonnets was next taken up. Slides showed the four types of bonnets tested and the report indicated that a high, straight sided bonnet or a high pitched-in bonnet with the leaders occupying all top surface proved the most efficient. Much argument has been heard, stated Professor Kratz, on the possibility of using a one size smaller furnace on forced air as compared to gravity operation. Tests show that the deciding feature is the length of time between firing periods (the larger furnace giving a longer period between firings) and also showed that fuel consumption was about the same, efficiencies differ only slightly, register air temperatures are higher with the smaller furnace. These discussions will be taken up in detail by S. Konzo in his forthcoming series on forced air findings from the residence.

A report on summer cooling at the residence was presented by S. Konzo. Mr. Konzo first reviewed the 1932 and 1933 tests on cooling with ice and night air cooling. The

(Continued on page 61)



C. A. Olsen
Director, Two Years



Richard Judd
Director, Two Years



Dana W. Norris
Director, One Year



H. S. Sharp
Director, Two Years

FOR SALE—Service—Until Sept. 1st we will clean your Furnace the old fashioned way for 85c, or with Suction Cleaner, \$1.50. All expert work. Any make furnace repaired. See us for fans and Heat Regulators.
WOODSTOCK HEATING CO.
 111 Dean St. Phone 282

The Humble Want Ad

NOTICE—Phone your order now if you want your furnace Vacuum Cleaned for \$1.50. We repair all furnaces, expert work. Phone 282. 111 Dean St. **WOODSTOCK HEATING CO.**

Puts Over a Sales Campaign

HOW the humble "Want-Ad" helped E. W. Ebert of Woodstock Heating Company, Woodstock, Illinois, to put a newly purchased business in a flourishing condition in his first year of ownership is an interesting story.

Early in 1932 Mr. Ebert purchased the Czadek Sheet Metal Works from its owner and reorganized the business at the same stand, 111 Dean Street, at the same time changing the name to one which he thought had a more direct appeal to householders and women especially.

Coming a stranger from an-

other state to this little city of 6,000 people about 60 miles northwest of Chicago, Mr. Ebert found himself well occupied at first with establishing his contact with former customers of Czadek Metal Works, picking up odds and ends of a business that embraced the retailing of wash machines, refrigerators, ironers as well as tinwork, roofing and jobbing of all kinds.

By the middle of summer, however, he was ready to branch out in search of new business in the heating field. After carefully sizing up his probable customers and the various methods of advertis-

ing approach, he decided to use the classified advertising columns of the larger of the two daily papers. In this way he hoped to reach both townspeople and the farmers who looked to the merchants of the county seat city of Woodstock to supply their home and business needs.

In the first place the classified advertisement was generally effective. In the second place it was cheap—50 cents a single insertion, one dollar for three succeeding insertions, a dollar and a half for six insertions. The plan was to run one advertisement for

(Continued on page 67)



Mr. Ebert's store and display window is clean, thoughtfully arranged and inviting.



AMERICAN ARTISAN

Air Conditioning Section

**Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings**

OF all the problems which the air conditioning contractor encounters no one brings more acute pain than the problem of uniform temperature throughout the house. "Why is this room colder than so and so?" "Why can't I keep this room up to 72?" are everyday occurrences.

--- One of the principal reasons for this frequent trouble is that for years we have been trying to lick sun, wind, shade, difference in glass areas, room arrangement with one lonely little thermostat. To win such a battle just isn't in the cards.

--- The quicker the industry accepts the fact that in most houses we should have more than one thermostat, just that much sooner will we begin to give the owner the kind of operation he thought he was buying and the sooner will we remove a source of constant trouble.

--- Hence the articles beginning this issue on zone control. Your participation in a round table discussion is invited. This is your chance to establish facts of money value.

MORE *than* NORMAL SERVICE

...and why!

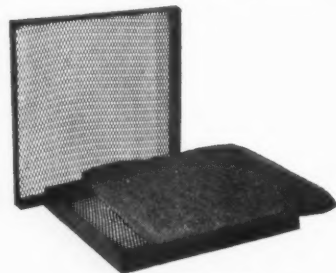
A Furnace Manufacturer writes:*

"It is really surprising to find so many users are able to obtain MORE THAN NORMAL SERVICE with your **THROWAY** filters."

Surprising to him because he had judged the **THROWAY** filter by its low price rather than by its performance.

The "more than normal service" of American **THROWAY** filters is due to three definite reasons:

1. The patented split wire filtering media—continuous strands of uniform size having sufficient "curl" or spring to prevent matting.
2. The method of weaving the pad to obtain uniform density—leaving no holes or thin spots where dust or dirt might leak through.
3. The new liquescent viscous coating developed especially for American renewable type filters which greatly increases their dust holding capacity.



RENU FILTER

An all-metal renewable type furnace filter. Only filter pad replaced.

In addition to these superior construction features the dependable service that users obtain from American Air Filters is the result of 14 years of experience in designing and building air cleaning equipment to meet every domestic and industrial need.

Send for your copy of "Profits From Clean Air" descriptive of our full line of American Air Filters. Engineering advice and other information will be gladly supplied without obligation,

* Name on request.

AMERICAN AIR FILTER COMPANY, Inc.

113 Central Avenue, Louisville, Kentucky

In Canada, **DARLING BROTHERS, LIMITED**, Montreal, P. Q.

AMERICAN AIR FILTERS



American Artisan takes pride in announcing that during 1935 a series of articles dealing with the forced air heating facts disclosed by research at Urbana will be presented by S. Konzo, who has been connected with research program for several years. Each article will be complete in itself and will discuss fully one pertinent fact of vital concern to the installer.

Forced Air Heating Facts From The Research Residence

By S. Konzo

This and succeeding articles on the forced air heating research carried on in the Research Residence are based to a large extent on material published in Bulletin 266 of the Engineering Experiment Station of the University of Illinois. The author has also drawn on additional sources for these discussions.

Former Gravity Plant

DURING the period from 1924 to 1931 the research work on warm air heating at the Research Residence was conducted with a gravity plant, although in some of the tests, combination fan and gravity systems or "booster fan systems" were used. In Fig. 1 is shown the basement plan of the Residence and one of the gravity installations tested. It may be noted that in accordance with good recommended practice, the furnace is located approximately in the center of the basement space. All warm air pipes and cold air returns were ample in size, and were carefully in-

stalled to avoid sudden changes in section and sharp bends. In addition, the warm air leader pipes were taken off the sloping bonnet at about head level and were directly connected to the vertical stacks and risers.

The gravity plant consisted of a common type of cast, circular radiator furnace having a 27-inch firepot and 23-inch grate. In most of the tests a 52-inch casing was used. The total leader area taken from the bonnet was approximately 832 square inches, and the total return duct area was approximately 854 square inches. The gravity system as installed performed satisfactorily in

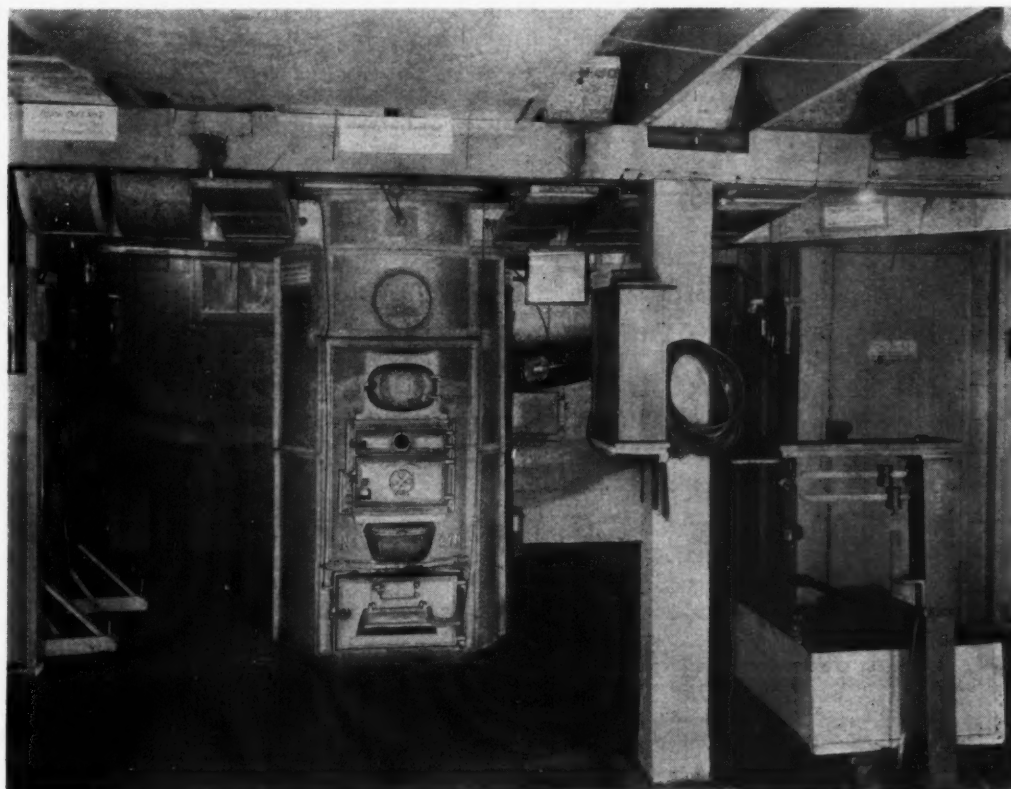


Fig. 3—Photograph of the forced air heating system in the Research Residence, showing high bonnet used in some of the tests and a portion of the elaborate testing equipment.

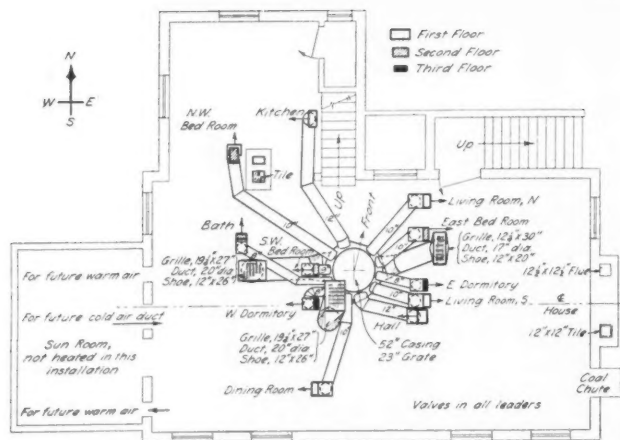


Fig. 1—Basement plan of a gravity heating plant in the Research Residence.

maintaining proper air temperatures in the Residence.

Limitations of a Gravity Plant

However, there are certain limitations inherent in any gravity plant, and when the plans were first made for the installation of a forced-air system, particular attention was paid to the following features:

a. Location of Furnace

In a well designed gravity plant the location of the furnace is practically confined to a central part of the basement, as shown in Fig. 1. Although this central location allows for some uniformity in the length of the leaders to the various boots, it does nevertheless place the furnace in that part of the basement which could profitably be used for other purposes.

Such limitations as to the location of the furnace in the basement are of less concern in a forced-air system. Consequently, in the case of the Residence installation, it was felt that advantage should be taken of this possibility of locating the furnace in a less conspicuous and more convenient

part of the basement. The basement plan in Fig. 2 shows that the location finally chosen was at the East end of the basement near the outside chimney connection and near the coal bin, which is located in the southeast corner of the basement. A photograph of the casing and furnace installation is shown in Fig. 3.

It would have been possible to build a special furnace room in that end of the basement by erecting a fireproof wall that would have separated the furnace and fan from the rest of the basement. It should be kept in mind that the location of the furnace was not confined to that position which was actually selected. It was possible to locate the furnace at practically any point in the basement, as long as the smoke-pipe connection to the chimney was not too long for the maintenance of a proper draft at the furnace.

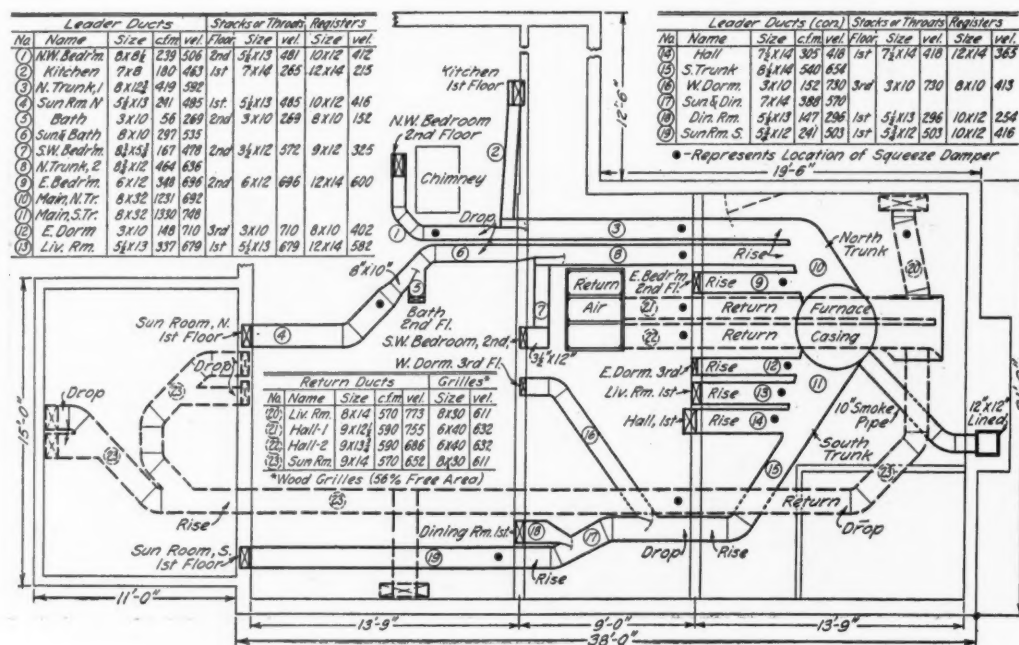
b. Increase in Available Head Room

A feature of forced-air systems that is clearly indicated in Figs. 3 and 4 is that of increased head room in the basement made available by locating the air ducts along the ceiling and in the joist spaces. In a gravity plant, not only the furnace casing and cold air boot, but also all the warm air leader pipes obstruct basement space. Even in a fairly compact installation, as that shown in Fig. 1, over 50 per cent of the basement space is occupied by the installation.

As far as possible in the forced-air heating plant, all ducts were placed in the spaces between the joists, and in every case where this was not possible, a clearance of 6 ft. 6 in. was maintained between the bottom of the duct and the basement floor. Thus the basement was free from duct interference, and the head room was such that a false ceiling could have been constructed to conceal the duct work. The depth of the basement from the floor to the bottom of the joists was 7 ft. 4 in., and the joists were 2 in. x 12 in., spaced 16-in. on centers.

The basement plan in Fig. 2 indicates the
(Continued on page 41)

Fig. 2—Basement plan of the forced air, trunk-duct system in the Research Residence with data sheet tabulations giving all the engineering data used in designing, installing and testing the plant's operation.



Air Conditioning Questions and Answers

Gas Corrosion

American Artisan:

We have at present several gas-fired installations that are in need of a flue lining. What metal is best suited to resist gas corrosion and condensation found on these jobs? Do you know of any flexible tubing that is made to be installed where chimneys have offsets?

We have been debating whether to use lead coated copper or copper pipe on these jobs.

R. J. B., Pennsylvania.

Reply by The Editors

There has been endless argument in the industry over this problem. Manufacturers of all kinds of materials have recommended their products, only to have contractors cite instances where these materials failed to stand up. We doubt whether any convention held in the last five years has failed to have this problem brought up, and to our knowledge it has not yet been satisfactorily answered from a material standpoint.

We feel that the answer lies in combustion, not in materials.

Reply by B. L. Schwartz, Pittsburgh

Condensation troubles with gas fired equipment are caused by improper combustion and excess air; either or both. Hence a correction of these conditions is the most desirable method of eliminating condensation troubles, rather than lining the chimneys to prevent the condensate from coming through the walls. Condensation troubles are also indicative of higher fuel costs than would be required if these conditions were overcome.

It is thus apparent that it would be better to spend any money required to correct the cause for improper combustion or excess air supply, rather than to have the chimney lined.

We have installed hundreds of gas fired installations in the Pittsburgh district and have never had any condensation complaint. This is probably due to the fact that all our jobs are automatically controlled. This elim-

inates the most common cause for excess air, which results in low flue temperatures and condensation.

A hand controlled job, for instance, may have the gas cock wide open or, as is more often the case, the gas inlet throttled down. Since the air inlet is permanently fixed, the correct air and gas mixture of 20 to 1 may become 40 or more to 1. This lowers the flue temperatures below the dew point and causes excessive condensation. Automatic controls, with its "all on" or "all off" operation corrects this condition.

Reply by Jack Stowell, Aurora, Ill.

Quite a number of types of linings have been used in this territory, including aluminum, porcelain enamel, Allegheny metal, and spraying the inside of the chimney with a clay composition plastic lining.

We are now using Enduro 18-8 Stainless Steel, which according to tests is apparently the best material discovered thus far for this purpose.

We manufacture our own flexible tubing, using the Enduro 18-8.

I am inclined to believe that lead coated metal would not work out so well and I am sure that copper pipe would be very unsatisfactory for this work.

Inlet Temperature

American Artisan:

Referring to Chapter 3, page 24, of your book "Forced Air Heating," I would like to have an explanation of the formula for determining the inlet temperature. Where can we locate or determine the factors 48.96 and 66 used for determining the CFM?

R. K. R., Louisiana.

Reply by Platte Overton

A B.t.u. is the amount of heat energy required to raise the temperature of one pound of water 1 degree F. In handling air, we must remember that all B.t.u.'s are based on water, and pounds and ordinarily the amount of B.t.u.'s per hour.

In the case of air, we have cubic feet per minute in place of hours, air in place of water, and cubic feet in place of pounds.

It is, therefore, necessary to divide the B.t.u. by the factor we establish by multiplying the specific heat of air (.24) which changes our water to air; by the weight of one cubic foot of air at the given temperature; which changes our pounds to cubic feet and by 60; which changes the hours to minutes, or

$0.24 \times \text{weight of one cubic foot of air at given temperature} \times 60.$

This is for 1 degree difference in temperature hence we add the difference in the temperature drop from the inlet grille to room temperature, or in case our inlet temperature is 120 degrees and our room temperature 70° we have $120 - 70 = 50$ or in our equation $(t_1 - t_2)$, hence for air at 120 degrees at the register and room temperature of 70 we have

$$\text{C.f.m.} = \frac{\text{B.t.u. loss}}{.24 \times .068 \times (t_1 - t_2) \times 60} =$$

B.t.u. loss	B.t.u. loss
.24 × 0.68 × 50 × 60	48.96

Note that two items in the equation are subject to change, the weight of one cubic foot of air and the temperature difference. Thus, for air at 140 degrees at the register we have

$$.24 \times .066 \times 70 \times 60 = 66.49 \text{ or } 66 \text{ approximately.}$$

Water Cooling

American Artisan:

I have a question I would like to ask, the question is—How much can I reduce the air temperature by introducing a spray of water, temperature of water being 55 degrees and the air being 90 degrees, wet bulb temperature 62 degrees which corresponds to a relative humidity of 20%. I wish to increase the humidity to about 50%, also how much will the air raise the temperature of the water before evaporation starts and what will be the latent heat of the water.

As for example, assume we have 25,000 cu. ft. of air to handle per minute at 90 degrees with a relative humidity of 20% and we wish to increase the humidity to 50%—how much will we cool the air?

A. E. Y., Washington.

Reply by Professor H. J. Macintire

In the case of the use of a relatively cold water spray you will cool the air and evaporate some water at a new wet bulb temperature which will be less than the 62° F. stated in your problem as the wet bulb temperature of the atmospheric air. However, it appears to me that your problem is indeterminate because different answers will be obtained with each water rate. The latent heat of the water is approximately 1057 B.t.u. per lb., and you can cool the air to a temperature approximately 70° F.

More systems than the contractor can keep track of have been proposed or are in use for sizing the ducts used in forced air systems. Some of these systems are accurate in any kind of a house; others are good only within certain limitations. The system explained here has been used for many years by many engineers. If you want a system suitable for any type of house, you will like to use this plan when you install

By
Platte Overton

Air Conditioning For Radiator Heated Houses

THESE pages have contained many articles on the design of supply and return ducts used in connection with mechanical heating systems. Such design may range in scope from those designed with allowances for drive cleats and rivet heads to the old time velocity method.

For the design of our duct system we will use the equal friction per linear foot method, produced several times in this section in past articles. The charts are reproduced here in Figs. 1 and 2, and the method of application will be briefly reviewed.

The Single Line Layout

Before we proceed we draw a line as shown in Fig. 3. This line should follow the general course of the supply trunk lines and branches. The c.f.m. should be shown for each section of the trunk duct. This may be in pencil and erased when the drawings are inked in. The c.f.m. is taken from the data sheet.

We have a total of 884 c.f.m. distributed as follows: Sun room 324 c.f.m., living room 210 c.f.m.,

dining room 350 c.f.m. We size the main at the plenum chamber from the table given here:

800 c.f.m.	900 ft. per min.
1,000 "	950 " " "
1,200 "	1,000 " " "
2,000 "	1,150 " " "
3,000 "	1,250 " " "
4,000 "	1,350 " " "
5,000 "	1,425 " " "

If all the above c.f.m. were in ducts 100 feet long they would have the same pressure drop approximately.

After the single line is drawn in and the various c.f.m. requirements noted we proceed to use the charts in Figs. 1 and 2 as follows: We have 884 c.f.m. total at our plenum chamber. For our main trunk velocity at this point we have 884 divided by 900 equals .982 square feet or a round duct 13½ inches in diameter. The reader will find circumferences and areas of circles in most catalogs. We must bear in mind that the various charts for determining duct sizes are given in round ducts.

Fig. 1

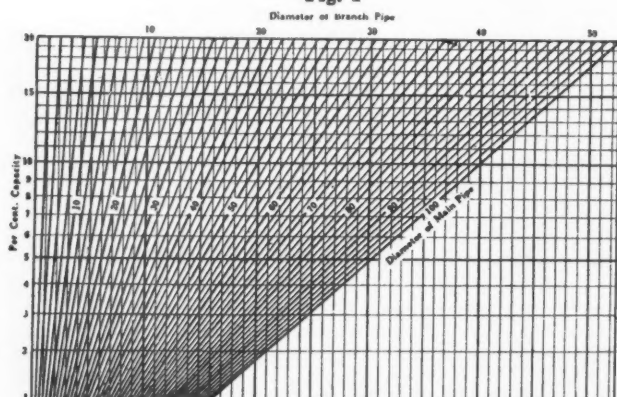
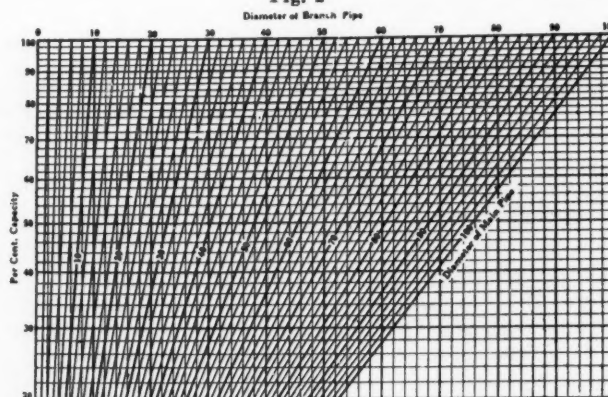


Fig. 2



Above are two charts showing the diameter of branch pipes necessary to carry given percentages of the total air carried in the main pipe with the same friction per foot of length. To use the charts, determine what percentage of air you want the branch pipe to carry; find this percentage at the left; move across to the right until you intersect the size of the main; read directly above at the top the diameter required in the branch.

The percentage reduction for equal friction per linear foot is very accurate, but large scale charts must be used. If you are interested in this method and want charts, write us.—The Editor.

These round pipes may be changed to equivalent rectangular ducts for equal friction after the various sizes are determined.

Our first branch requires 324 c.f.m. 324 divided by 884 equals .367 equal 36.7% of a 13½-inch duct for equal friction loss per linear foot. Referring to the chart, Fig. 2, we locate 36.7% on the left hand margin and move to the right until we intersect with the 13½-inch diameter of main pipe line. From this point we move up to the top of the chart and find the size of our branch, or in our case a duct 9 inches in diameter.

For the continuation of our trunk line we have 100% less 36.7 equals 63.3% of a 13½-inch round duct. Again we use the chart and locating 63.3% on the left hand margin and proceeding as before we find our main is 11¼ inches in diameter with 560 c.f.m. The next branch is to carry 210 c.f.m.

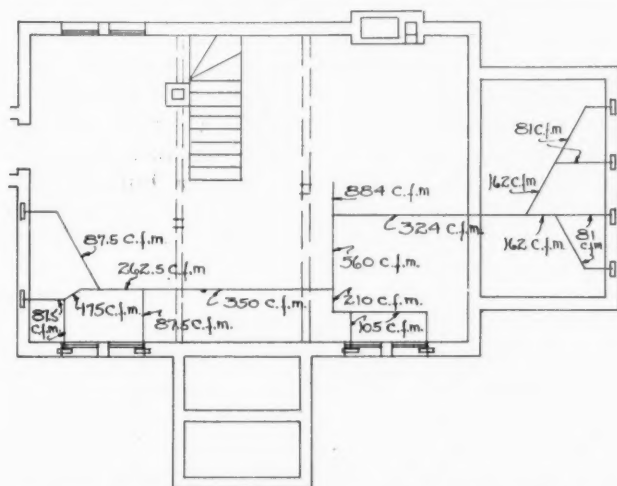


Fig. 3—The first job is to locate registers. Next bring registers into a piping plan using a single line as shown here. Then from your data sheet enter the register c.f.m. on each branch for each register. Add up your c.f.m.'s back to the furnace. You now have a sketch like this.

210 divided by 560 equals 37½% of a 11¼-inch pipe equals a 7½-inch pipe with 210 c.f.m.

Our first branch with 324 c.f.m. is really a branch trunk line and requires calculation of the various sizes with the same procedure.

Fig. 4 shows the various round pipes changed

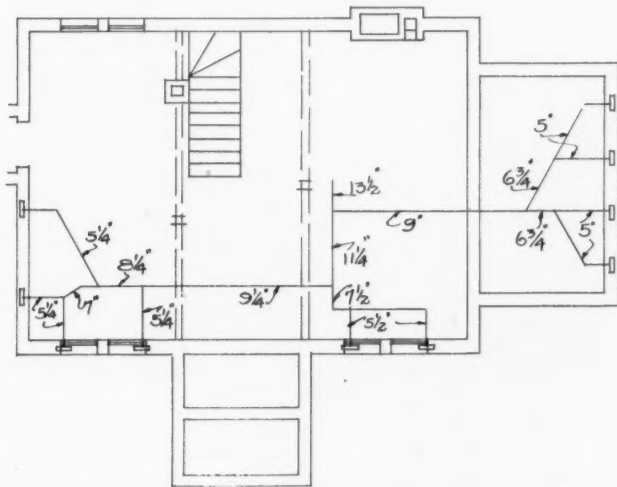


Fig. 3A—On the same single line drawing made in Fig. 3 use the method explained in this article to convert c.f.m. to equivalent friction round pipe. You will get a sketch like this.

to equivalent rectangular ducts for equal pressure loss.

Volume dampers may be installed if desired and the registers or grilles may have a louvre to close them off or volume the air flow.

The 4 by 6 duct to one of the four grilles in the dining room carries 87.5 c.f.m. A 4 by 6 duct is .166 square feet area. 87.5 divided by .166 equals a velocity of 525 feet per minute. The 13½-inch main at the plenum is 28 × 6; equals 1.175 square feet, or 884 divided by 1.175 equals a velocity of 757 feet per minute. Thus our velocities range from 757 to 525 at the far end of the trunk.

Future Velocities

That such velocities could be increased and the duct sizes reduced is a problem for future articles. The writer believes that velocities up to and including 2,000 feet per minute in relatively small ducts is only a question of time and investigation. As stated, our ducts in the problem have velocities of 700-800 feet per minute down to 400-500 feet per minute in small branches. These velocities may be increased to 1,200 down to 700. The ducts would be decreased slightly and it is

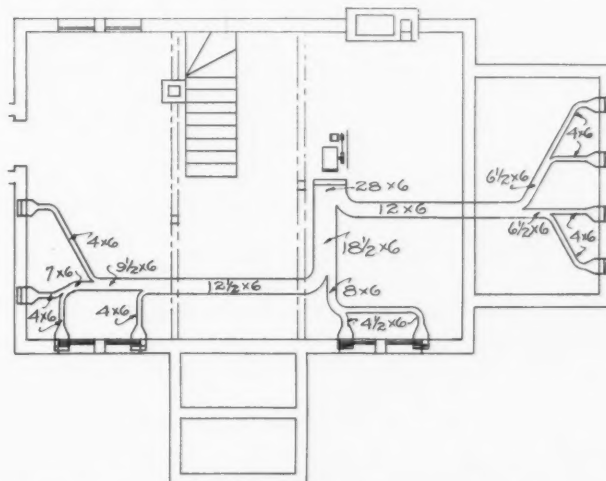


Fig. 4—Next convert the round pipe diameters into rectangular ducts having your selected duct depth. Enter the sizes as shown here. You now have a rectangular duct plan all sized.

doubtful if any particular saving in material or labor would be effected.

Future investigations over ducts approximately one-half the present sizes will demonstrate the practicability of such methods.

Rooms 101-102-104 are each on a separate branch of the main trunk line making it possible to control each room as a zone. These zone dampers will be discussed under the chapter on temperature control.

The return piping is simple, as it consists of a direct connection from the large return face near the stairway to the fan chamber.

Where the warm air supply inlets are located on an outside wall as shown on the house in our problem, it is extremely doubtful that there will be any gravity service when the fan is idle. This will call for more service of the blower, but our power consumption on this installation will be comparatively low.

Automatic Controls in Air Conditioning Systems

This series of articles on automatic control systems now reaches the point where we are vitally interested in giving the owner accurate control and uniform temperatures in every room. We have found this difficult to do with one thermostat. The best method so far devised with intermittent fan operation is to zone the building and have a thermostat in each zone. Here is a discussion of the plan and its problems.

SO FAR in this series of articles on automatic control of forced air and air conditioning systems we have used only one thermostat for the entire structure irrespective of the size, number of rooms or general layout of the building.

When we get right down to cases the most satisfactory installation would be a small, one-room building, with an individual heating plant. With such a layout our heating plant would be called upon to meet *only* the needs of the one room and would respond readily and uniformly to every change due to effects of sun, wind, temperature drop, and combinations of these and our individual heating plant, in turn, could keep up with the changes.

Unfortunately, however, we are seldom called upon to design an automatic control system for a one-room dwelling—it is usually a structure with several rooms, each room differently affected by outside and inside conditions, also by individual desires of the family—yet our single heating plant must meet all these demands.

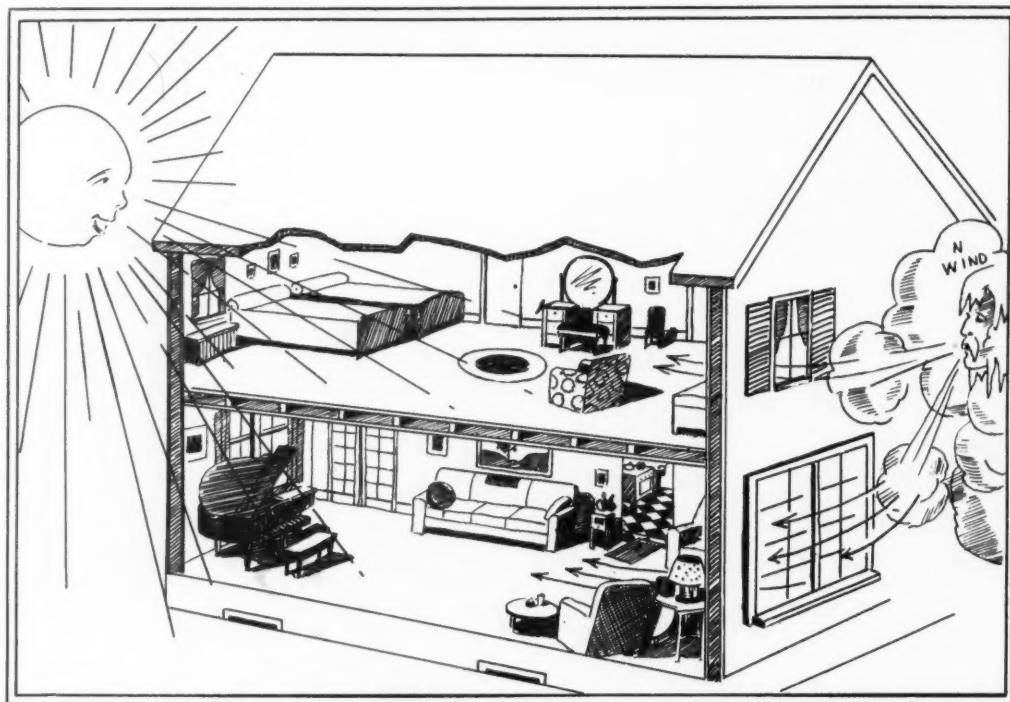
The chief drawback to all control systems

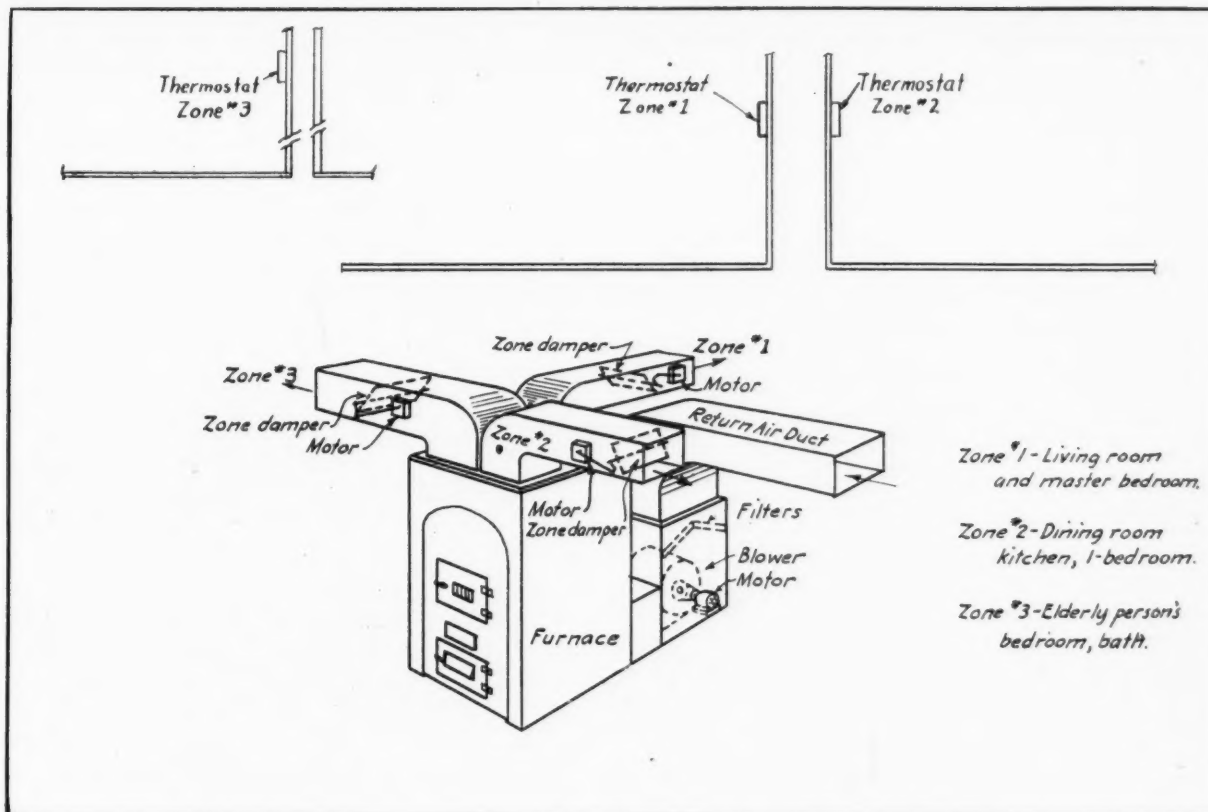
where only one thermostat is used lies in the fact that even the smallest house does not lose heat uniformly. For example, one side of the house is exposed to the sun and on bright days the rooms facing the sun tend to maintain a higher level of temperature than do the rooms on the shady side. If we place our thermostat in a shady room we may over-heat the sunny rooms. If we place our thermostat in the sunny rooms we may get underheating in the shady rooms.

Air Volume Troubles

Further, if the house is two or more stories high we may not want to keep the bedrooms at the same temperature as the downstairs rooms and if we have only one thermostat we must compensate for this temperature difference by adjusting dampers so as to reduce the amount of air entering the upstairs rooms, or we can size our ducts to deliver only enough air for a lower upstairs temperature.

The obvious disadvantage of this plan is that





We are going to discuss zone control using a house having three zones and a layout of equipment as shown here. On this basic diagram the different variations of zone control will be presented.

we cannot be sure that the owner will always want the upstairs rooms at lower temperatures. If we have sized our ducts for less air delivery we can do very little except to try raising the register temperature. If we have adjustable dampers we can try changing the setting for more air.

The practical solution to this problem lies in the use of more than one thermostat. The question then is—how many and where?

Let us consider the question by thinking of our house in terms of separate blocks of rooms. Suppose our house is nearly square and two stories high. Also that the house faces south and has a living room across the entire front with the kitchen and dining room behind along the north wall. Let us assume that we have a sun porch off the living room on the southwest corner and that upstairs the master bedroom is directly over the living room with a bath and two smaller bedrooms along the back or north wall.

Sun Effect

Any heating effect from the sun will tend to warm the living room, sun porch and master bedroom, but will have little effect on the remainder of the rooms. We can assume, then, that to maintain a good balance of heat, at least two thermostats and two zones of air supply are required. But to make the problem just a little more interesting, let us assume that an elderly person will occupy one of the back bedrooms and will want their room at the highest temperature within the house. Let us say that we want to keep the living and master bedroom at 73, the dining room, kitchen and one back bedroom at 68 and the elderly person's bed-

room and the upstairs bath at 78 degrees—all at zero degrees outside.

We will then need three thermostats—one for each block of rooms requiring the same temperature. In planning our control layout we place the first thermostat in the living room, the second in the dining room and the third one in the elderly person's bedroom. Of course, we can vary this arrangement as needed, keeping in mind that we want an advantageous location where the instrument will get some air movement, but not strong draft, and also that the owner may have decided views on where the instrument should be placed with relation to the furniture.

The Piping Plan

To make these three thermostats serve their intended purpose the warm air distributing system must be divided into zones so that each thermostat can control the air flowing through the group of pipes which serve its block of rooms.

We must not forget that in this system we have only one register air temperature to work with and that this temperature will be the same for all rooms or if there is a decided drop in temperature due to duct heat loss in any one piping group we have compensated for this duct heat loss by sizing that group of pipes to carry a larger quantity of air at the lower temperature.

We must meet the needs of each thermostat, then, by altering the heat input by controlling the amount of air entering the block of rooms.

There is nothing particularly difficult about the
(Continued on page 40)

SURVEY SHEET STATIC PRESSURE METHOD													VELOCITY METHOD
	N ^o .	BTU HEAT LOSS	C.F.M. TEMP. 150 F	LEADER SIZE	STACK SQ. IN.	REGISTER FREE AREA	VELOCITY THRU REGISTER	STACK VELOCITY F.P.M.	STACK STATIC PRESSURE	LEADER STATIC PRESSURE	TOTAL STATIC PRESSURE	RATIO DAMPER SETTING	RATIO DAMPER SETTING
LIVING ROOM	1												
	2	27972	160	63	42	80	280	620	.00575	.009	.01475	69 %	94 %
FRONT HALL	3	6993	80	63	42	80	140	310	.0016	.0013	.0029	14 %	48 %
DINING ROOM	4	14985	170	63	42	80	300	660	.0065	.011	.0175	81 %	100 %
KITCHEN	5	11988	140	63	35	72	280	620	.0065	.015	.0215	100 %	94 %
PANTRY	6	4995	58	63	35	72	115	260	.0013	.0025	.0038	18 %	40 %
REAR HALL	7	6120	71	63	35	72	140	310	.0018	.005	.0068	32 %	48 %
BED ROOM	8	8991	100	63	35	72	195	450	.0075	.00575	.01325	62 %	68 %
BATH	9	3996	46	63	35	72	90	210	.0018	.0015	.0033	15 %	32 %
BED ROOM	10	8960	100	63	35	72	195	450	.0075	.002	.0095	44 %	68 %
BED ROOM	11	5494	63	63	35	72	125	280	.0033	.00375	.00705	33 %	42 %
BATH	12	5200	60	63	35	72	119	265	.0029	.003	.0059	28 %	40 %
BED ROOM	13	7992	90	63	35	72	180	400	.0065	.00325	.00975	45 %	63 %
3RD. FLOOR	14	6980	80	63	35	72	155	350	.008	.0035	.0115	54 %	53 %
3RD. FLOOR	15	7200	83	63	35	72	160	370	.009	.0045	.0135	63 %	56 %
TOTAL		127,866	1301										

Setting Dampers To Static Pressure

By W. E. Keist
Consulting Engineer

A YEAR or so ago the writer of this article suggested a plan called the "Velocity Damper Setting Method." It was suggested that the plan was especially suitable for comparatively small installations. This article suggests another plan by which dampers are set by reading static pressure. It is illustrated by a specific problem.

The installation on which the writer was called on to make recommendations and to offer suggestions as to the necessary changes, is as follows:

This was a new installation with the exception of the first, second and third floor stacks. The return air was taken from the basement and all 9-inch pipes were used regardless of the length, elbows or the amount of air each had to supply. The furnace was designed to burn natural gas and had a B.t.u. input of 270,000 B.t.u. or 270 cubic feet gas per hour.

This system never heated satisfactorily and could have been used as a weather vane, since every wind shift could be told on the inside without going out to find which way it was blowing. Every shift

effected the heating of certain rooms and as this house was located in one of the best residential sections of Pittsburgh it was desirable to have this system operate as near perfect as possible as a poor operating system would effect the future installations in this community.

New return airs were installed, complete with blower, filters and volume dampers in all warm air lines; we also eliminated the pitch in the pipes, running them horizontal so as to have more head room in the basement.

After the work was finished the next job was to properly set the dampers. From the survey sheet the calculations for damper settings were taken and the dampers set accordingly.

How the total static pressure of the leader and stacks were arrived at was as follows: The leader pressure was taken from the furnace to the stack boot and the stack pressure was taken from the boot to and including the outlet. The Standard Code suggests that second floor stacks should be 70 per cent in size of the existing leader pipe and the third floor 60 per cent of the same. Thus a second floor stack being vertical the static pressure would be

Air conditioning installers are always interested in ways and means of setting pipe dampers to get the calculated air delivery at each register. The author of this article suggests a method which he has found satisfactory on remodeled jobs. We will be pleased to have your reactions to his suggestions.

less than if the same pipe were horizontal. The length of the stack was 12 feet so to assume its static pressure it was figured thus—12 feet \div 70 equals 8 feet or the actual static pressure taken on this length. The third floor stack being 22 feet the static pressure was thus 22 feet \div 60 equals 13 feet or the actual static pressure taken on this length.

The total static pressure was figured as the product of the leader static pressure and the stack static pressure giving us the existing static pressure on each individual supply. After the existing pressure on each supply was known we were ready to go to work for our damper settings.

A Specific Example

The Survey Chart showed that number 5 run had the highest existing pressure and the ratio of damper settings were the product of the lower pressures divided by the highest or number 5. For example:

Number 5 had a static pressure of .0215 and No. 4 had a static pressure of .0175; thus the damper setting on number 4 would be $.0175 \div .0215$ equals 81 per cent and with number 5 being set 100 per cent open, number 4 was set at 81 per cent open. Thus by this method the Static Pressure was equalized on all supply lines and each could take its proper amount of air at all times.

Another example is the living room with two supplies—number 1 and 2. Since number 1 had a static pressure of .01475 and number 2 had .01875, their damper settings would be—each divided by

the highest or number 5 would give number 1 with a setting of 69 per cent and number 2 with a setting of 87 per cent.

After setting each damper according to its ratio and the system started for our test a temperature reading was taken and the temperature of each individual room did not vary over 2 degrees. With that result the original damper settings did not have to be varied any from the start.

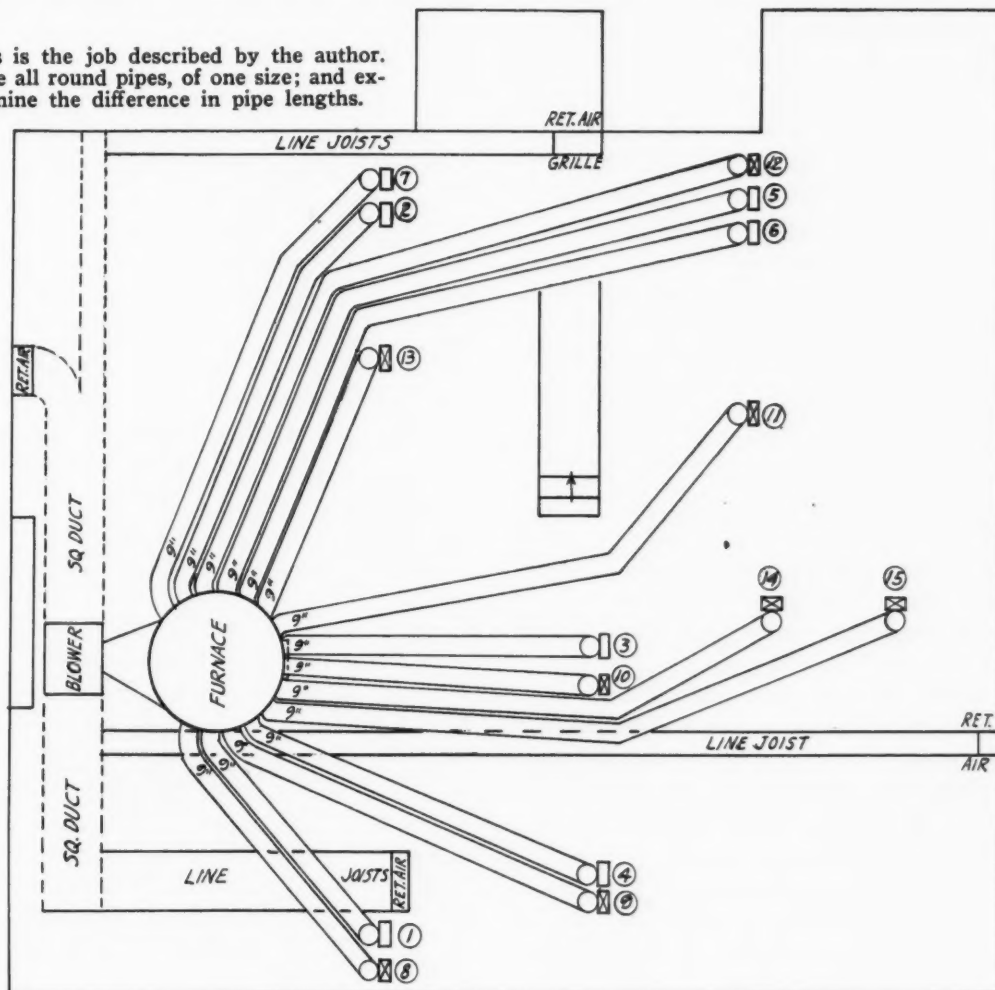
Heat Output

The calculating of the input of the furnace had to be an assumption, since the heat loss was 127,866 B.t.u. plus 10 per cent for extreme demands made a total of 141,000 B.t.u. load for the furnace to supply. The original setting of the furnace with an input of 270,000 B.t.u., without reduction would have given a very intermittent operation rather than the continuous operation which is far more satisfactory. We also wanted to lower the override in temperature, eliminate cold 70 and keep the register air temperature near what we calculated—150 degrees. To accomplish this the input of the furnace was cut to 205,000 B.t.u. or 205 cubic feet of gas with an average of 1000 B.t.u. per cubic foot and with an assumed overall efficiency of 70 per cent. The delivery of the heating system would then be 143,500 B.t.u.

In equalizing the air supply to each room with an anemometer, it is the writer's opinion that this takes longer than by using the ratio ideas. From

(Continued on page 39)

This is the job described by the author.
Note all round pipes, of one size; and examine the difference in pipe lengths.



Temperature and Humidity— Inseparable Factors of Air Conditioning

By Guy S. Faber

OUT on the front porch on a June day, sleeves rolled up and feeling fine. The temperature is 70 degrees and the relative humidity is 45%.

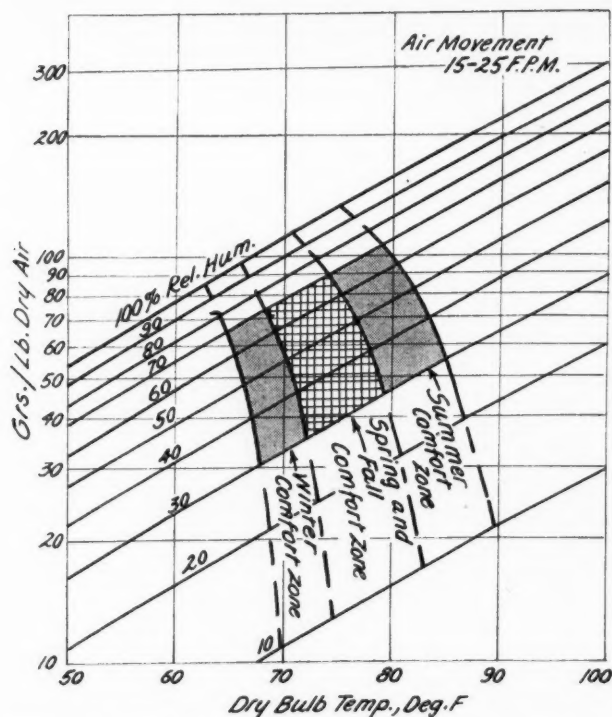
Why not have this wonderful day every day, with the comfortable feeling this combination of temperature and humidity bring? Humidity is the percentage of water vapor or moisture suspended or diffused in all the air surrounding us.

Therefore comfort cannot be brought about with temperature alone. Humidity and temperature belong together as a composite unit of human comfort. Dealing with temperature alone for comfort, by putting on more coal on a winter's day, is not satisfactory, for we should deal also with humidity. The higher we raise the temperature the lower we drop the humidity, doing just the wrong thing for comfort—in fact, working havoc with ourselves. When we artificially heat a building we must artificially humidify it—because temperature and humidity go hand in hand. Humidity is nature's garment of warmth which protects the human body from chill and drafts. For example, you have often stepped into the bathroom after someone has had a hot shower and felt a sort of balmy comfort about the air. Of course, there may have been too much steam in this small room which would over-humidify it—which is just as bad as overheating it.

Temperature-Humidity Balance

How to secure the correct balance between temperature and humidity is the object of these articles and we shall go step by step in dealing with the natural phenomena attached thereto.

It is the moisture surrounding our bodies, which protects us from chill. As an example of the opposite effect—suppose you had a bottle of ether or alcohol which has been standing up on a shelf for some time. Should you put a thermometer within the bottle, right into the liquid, you would find it exactly the same temperature as the air in the room in which it stood. Now pour a little on the palm of your hand. The latent heat of vaporization and the rapid evaporation of the volatile fluid,



The zone of comfort is different in summer and winter. This chart shows how the zone shifts upward during the summer and also shows a middle zone suitable for all four seasons of the year. These zones are for an air movement ordinarily found in a gravity or intermittent forced air system. Relative humidity is plotted against dry bulb temperature.

carrying the body moisture with it, leaves a cooling sensation or effect. Both the liquid and the hand are cooled by the latent heat of vaporization.

Another practical illustration—when you stand in front of an electric fan you feel cool. This is merely a cooling effect, for the fan has no refrigerating means. In fact, if it runs for several hours it actually delivers warm air caused by the heating of the motor. Your feeling cool is again merely the robbing of moisture from your skin. The human body has a quick regain. Step away from the fan and your skin will regain its loss of moisture in a very short time.

Just how much moisture can the body give up to dry, overheated air in the winter months, when we dry up and parch the air we breathe?

Let us step into the conservatory in one of our parks on a cold winter day. When on the outside, if we inhale quickly, our nostrils stick together from the very dry air outside. Inside we peel off our overcoats and walk down an aisle teeming with tropical palms and even banana trees with tiny bunches of fruit. You may even see lemons and oranges. Now walk right up to the recording thermometers and note the temperature averages 70 degrees F. on the chart. If you cannot read a wet bulb line, you may ask the attendant what the humidity is and he will be glad to state the humidities carried in the various rooms, depending on the plant species, but you will find it around 70 per cent.

(To be continued)

An Important Consideration In Gas-Fired Air Conditioning Plants—

Condensation of Moisture In Flues

By William R. Morgan*

Purpose of Investigation

A CONSIDERATION of the factors involved in the condensation of moisture in flues has become of especial interest with the advent and increasing use of gas-fired furnaces for the heating of residences, because of the possibility of seepage causing discoloration and damage to adjoining walls. Some conception of the magnitude of the condensation to be expected can be obtained by calculation of the quantity of moisture present in the flue gases and from a comparison of such values with the quantity of moisture required to saturate the flue gases at the temperature at which they emerge from the chimney under normal firing conditions.

Since the moisture in flue gases originates from moisture in the fuel, from moisture in the air used for combustion, and from the combustion of hydrogen in the fuel, the amount of moisture in the flue gas can be calculated from the fuel analysis and the moisture content of the air for any given set of firing conditions.

Experimentally-determined flue-gas temperatures resulting from a fairly wide range of firing rates complete the necessary data, for the moisture in the flue gases in excess of that required to saturate them at the temperature at which they emerge from the chimney will be the condensate, the amount of which is to be determined.

Scope of Investigation

The moisture content of flue gases resulting from the combustion of anthracite, semi-bituminous, and bituminous coals, oil, natural gas and manufactured gas has been calculated for a total of twenty-three individual fuels. The condensation to be expected with anthracite and soft coal and with manufactured gas has been computed using the calculated average moisture content of the flue gases for each type of fuel and the experimentally-determined flue-gas temperatures for a wide range of firing rates.

The important relationship between firing rates

and flue-gas temperatures, with gas, will depend largely upon the type of gas furnace, or upon the relation between size of burner and area of heating surface, and also upon the presence or absence of baffling or checker work in the case of the conversion burner, etc. It is evident, then, that, while the installation studied is considered to be a typical modern residence and furnace, considerable variation may be expected in other installations, and that the relations between firing rates, flue-gas temperatures, and condensation, which are given, cannot be applied indiscriminately to all residences and heating units.

An independent investigation has been conducted by A. C. Robertson of the Engineering Experiment Station Staff on the effects of the products of combustion on the corrosion of various materials. The results are as yet unpublished.

Acknowledgements

The data presented in this paper were obtained in an investigation which was conducted by the Engineering Experiment Station of the University of Illinois, of which M. S. Ketchum, Dean of the College of Engineering, was Director, in co-operation with the Clay Products Association. The research was carried out in the Department of Ceramic Engineering of which C. W. Parmelee, Professor of Ceramic Engineering, is the head.

Acknowledgment is made and thanks expressed to Prof. C. W. Parmelee for his part in the initiation of the investigation and for his continued interest and cooperation, and to Prof. R. K. Hursh for his suggestions concerning the calculations.

Vapor Pressure, Humidity, and Dew Point

A liquid enclosed in a vessel from which all gases have been removed will evaporate until the pressure of the vapor over the liquid reaches a certain definite equilibrium value which is termed the vapor pressure of the liquid at the given temperature. If a liquid is enclosed in a vessel which also contains a gas, approximately the same amount of liquid will evaporate as though the gas were not present, if the gas has a low solubility in the liquid and the pressure does not exceed about one atmosphere. Thus the vapor pressure of water in contact with air is approximately the same as the vapor pressure of water in contact only with its vapor.

*Special Research Assistant in Ceramic Engineering, University of Illinois, Urbana, Ill. This article is taken from a report of an investigation conducted by the Engineering Experiment Station of the University of Illinois in conjunction with the Clay Products Association. Report issued as Circular 22.

When the partial pressure of the water vapor in an air-water-vapor mixture is equal to the equilibrium pressure of water and its vapor at the same temperature, no more water can be taken up and the mixture is said to be saturated. Vapor pressure then is a measure of the degree of saturation which is commonly expressed as the ratio of the partial pressure of the water vapor in the mixture to the equilibrium pressure of water and its vapor at the same temperature, and is termed relative humidity or, when multiplied by 100, per cent relative humidity. Thus the saturated mixture has 100 per cent relative humidity.

Such units, however, are not satisfactory for engineering calculations since there is no constant quantity on which to base the computations. If moisture is added at constant temperature to an air-water-vapor mixture, either the pressure or volume must increase; or if an air-water-vapor mixture is heated at either constant volume or constant pressure, the "relative" humidity will decrease although the composition expressed either by weight or volume remains unchanged.

Engineering Terms

For these reasons, the following terms and units have been generally adopted for engineering calculations:

Humidity—expressed as pounds of water-vapor per pound of dry air.

Percentage Humidity—expressed as the ratio of the pounds of water-vapor per pound of dry air at a given temperature, to the pounds of water-vapor per pound of dry air required for saturation at the same temperature.

The vapor pressure at equilibrium between a liquid and its vapor increases with increasing temperature, as evidenced by the fact that a liquid boils when the vapor pressure has been increased by heating until at equilibrium the vapor pressure is equal to the total pressure on the liquid. Since the partial pressure of the water vapor is a measure of the concentration and the vapor pressure increases with increasing temperature, it follows that saturated air-water-vapor mixtures at higher temperatures have a higher humidity than do saturated mixtures at lower temperatures and that in passing from one to the other water will be removed from the mixture as the temperature is lowered. As the saturated mixture is cooled, water will condense until under equilibrium conditions the partial pressure of the water vapor in the mixture is equal to the equilibrium pressure of water and its vapor at the temperature in question.

When an unsaturated mixture is cooled, condensation occurs at the temperature at which the partial pressure of the water vapor in the mixture

is equal to the equilibrium pressure between water and its vapor at the same temperature, under which condition the mixture is said to be saturated. The saturation temperature, which obviously is the temperature below which the mixture cannot be cooled without causing condensation, is called the dew point.

Condensation Temperatures

The quantity of flue gas and the amount of water produced in burning a variety of fuels have been calculated from their analyses on the basis of normal firing conditions in which 100 per cent excess air was used with coal and 50 per cent with oil and gas. From these data the saturation temperatures of the flue gases and the amount of condensation at normal chimney temperatures for such fuels have been determined.

Johnstone has shown that the presence of sulphur trioxide in flue gases even in small amounts materially raises the dew point because of the formation of sulphuric acid. This is important in corrosion at relatively high flue-gas temperatures but has a negligible effect on the determination of the total condensation which will occur at relatively low flue-gas temperatures in dwellings.

The fuels for which calculations were made include the following:

Bituminous Coal	Dew Point
1. Illinois, Franklin County, Orient Mine	92° F.
2. Indiana, Sullivan County, Vandalia Mine	96
3. Pennsylvania, Armstrong County, W. Kittanning Mine	91
Semi-Bituminous Coal	
4. Virginia, Tazewell County, Pocahontas Mine	84
5. Pennsylvania, Cambria County, St. Michael Mine	83
Anthracite	
6. Anthracite (typical)	68
Manufactured Gas	
7. Coal Gas	136
8. Coke Oven Gas	136
9. Coke Oven Gas	137
10. Blue Water Gas	139
11. Carburetted Water Gas	131
12. Oil Gas	141
13. Blast Furnace Gas	135
Natural Gas	
14. Natural Gas, Follansbee, W. Va.	124
15. Natural Gas, Follansbee, Residual ...	125
16. Natural Gas, McKean County, Pennsylvania	128
17. Natural Gas, Sandusky, Ohio	131
Oil	
18. Pennsylvania, 28 degrees Baume.	112
19. West Virginia, 30 degrees Baume.	113

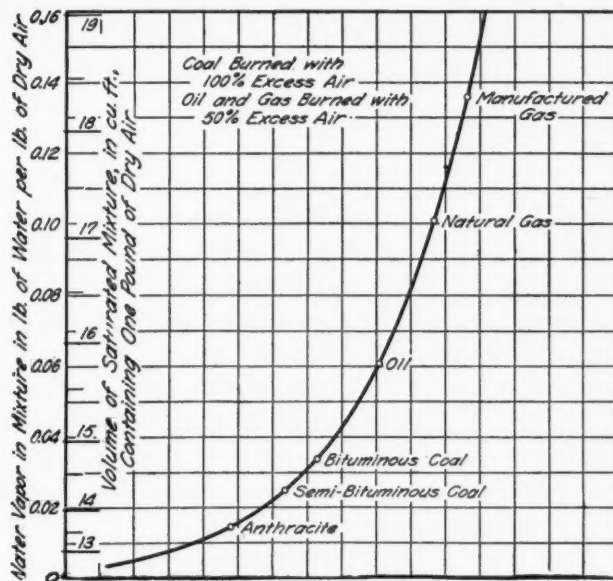


Fig. 1—Saturation curve showing dew points for combustion gases from various fuels.

- 20. Ohio, 28 degrees Baume 112
- 21. Bakersfield, California, 15 degrees Baume 108
- 22. Beaumont, Texas, 22 degrees Baume 109
- 23. Typical Fuel Oil, 38 degrees Baume.. 112

Type of Fuel	Average Temperature at which Condensation will take place, deg. F.
Anthracite	68
Semi-Bituminous Coal	84
Bituminous Coal	93
Oil	111
Natural Gas	127
Manufactured Gas	137

The difference between the water content at saturation for a given flue gas and that of the mixture indicated by the curve of Fig. 1 for any lower temperature shows the amount of condensation

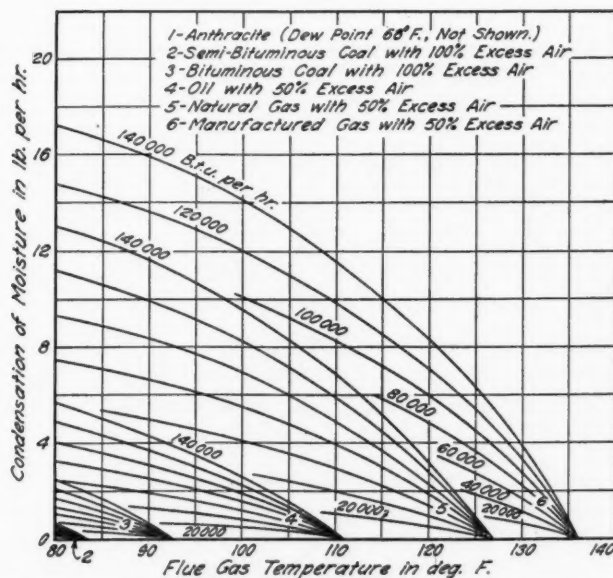
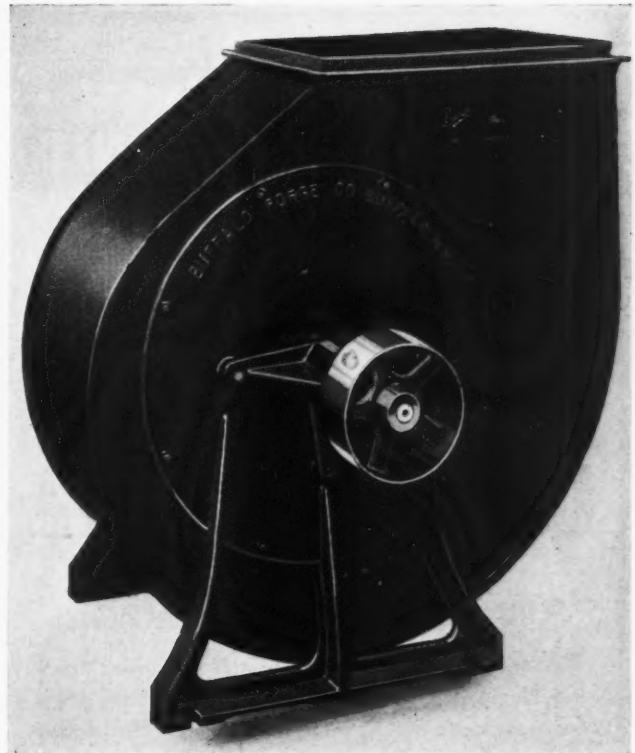


Fig. 2—Condensation limits with different fuels for various firing rates and flue gas temperatures.



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which would occur if the flue gases were cooled over this range.

The amount of condensation possible at various flue-gas temperatures for the several types of fuel, with normal excess air for combustion in each case, is shown in Fig. 2. The curves represent condensation for different firing rates from 20 000 to 140 000 B.t.u. per hour, the lowest condensation taking place at the lowest combustion rates. It is evident that, for any given firing rate and flue-gas temperature, condensation is highest for the fuel having the highest dew point and lowest for the fuel having the lowest dew point. Anthracite is not shown because of its extremely low dew point of 68 deg. F., which could not conveniently be plotted.

Effect of Excess Air

Increase in excess air reduces the degree of saturation of the flue gases and, therefore, lowers the dew point (see Figs. 1 and 3). Hence an increase in excess air would tend to decrease condensation.

An increase in excess air also decreases the flame temperature but, contrary to what might be

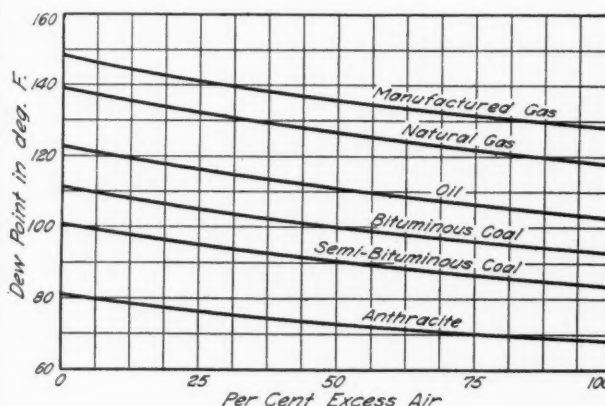


Fig. 3—Average relation between dew points and excess air for typical fuels.

supposed, generally increases the exit temperature of the flue gases. This is explained partially by the fact that the radiant heat emitted by bodies, such as incandescent carbon particles, carbon dioxide, and water vapor, is a function of the fourth power of their absolute temperatures. Therefore, combustion products at a higher initial temperature transmit their radiant heat more effectively. In addition, heat transmission by convection is less efficient with large volumes of gas. The combination of these conditions produces higher flue-gas temperatures in the chimney when larger amounts of excess air are used for combustion.

(To be continued)

Setting Dampers

(Continued from page 33)

the survey sheet the register velocity has been calculated for the proper heating of each room and the anemometer readings should correspond with the survey sheet. To do this takes hours of continuous damper changes to get the right setting. However, the anemometer could be used to very good advantage with the Ratio idea, such as checking the velocities after the dampers have been set.

Two Methods Compared

The two methods can be compared as follows—

Taking run number 5 on the static pressure survey we see that on account of having the highest static pressure this leader should be set at 100 per cent open. On the velocity survey it shows that run number 4 has the highest velocity and should be set 100 per cent open, because it does not take into account the existing pressure. If the velocity chart was used for damper settings a differential between rooms would be had.

To compare thus: run number 4 would take more air than needed and as much so as to equalize the existing static pressure on run number 5; in other words the static pressure would have to build up on run number 4 with a higher velocity and to equalize this pressure it would have a velocity of approximately 810 F.P.M. and a c.f.m. delivery of 210, when 170 C.F.M. is all that is needed, or a surplus of 40 C.F.M., causing an overheating of this room.

Again comparing run number 1 and run number 2 the static pressure chart calls for 69 and 87 per cent settings respectively, while the velocity chart calls for both to be set at 94 per cent. If both were set at 94 per cent the existing pressure would rob one and feed the air to the other, consequently run number 1 would carry a higher velocity, so as to equalize the pressure in run number 2. To do this run number 1 would carry a velocity of approx. 788 F.P.M. or 200 c.f.m. or 40 c.f.m. more than is needed. With this there is the possibility of one end of this room being warmer than the other.

We Must Think About Dampers.

It is the writer's opinion that as time goes on the setting of dampers will play a more important part in balancing forced and air conditioning systems, basing the opinion on the fact that many sheet metal shops are not capable of fabricating and erecting duct systems, and will depend on fitting manufacturers to supply individual square ducts for each room. These are, of course, made only in standard sizes.

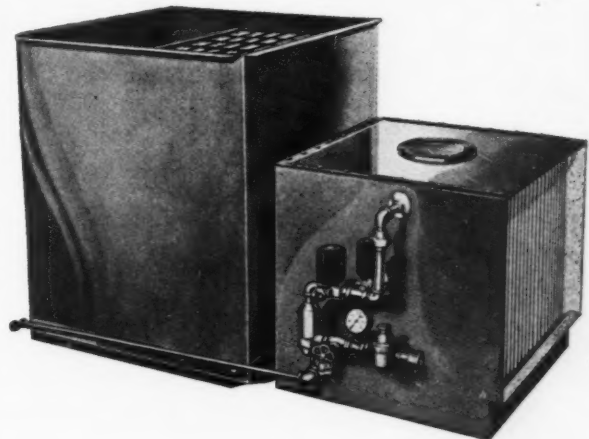
To get the actual static pressure a special size pipe might be needed or a size between two standard sizes—consequently the need for dampers and damper settings. Also the sheet metal contractor who is capable of fabricating and erecting a trunk line system sometimes in designing such systems to operate without dampers, cuts into galvanized iron and causes waste thereby increasing the cost of the system. Sometimes makes a duct 1 inch smaller than designed by static pressure, to save a quantity of iron and labor, but in doing this the static pressure is knocked "Haywire," again making the use of dampers and damper settings necessary to balance the system.

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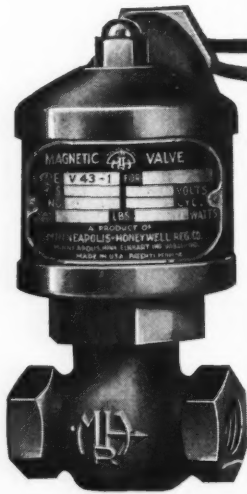
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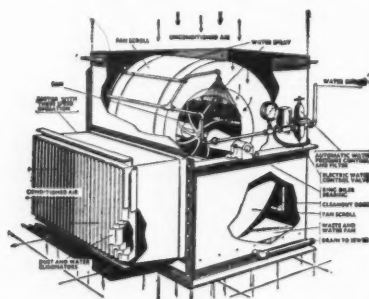


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Automatic Controls

(Continued from page 31)

mechanical part of the layout. If we use all rectangular ducts we run three mains—one main to each block of rooms and take all branches for each block of rooms off its particular main duct. If we use all individual leaders we must build some sort of a plenum chamber with three sections or take three stubs off the plenum and tap the leaders into the stubs.

The air flowing through each group of ducts is admitted or shut out of any one zone by a damper in the stub or plenum section. This damper opens or closes at the command of the zone thermostat. Let us imagine, then, that we have laid out this job and have rectangular ducts with three mains coming off the plenum. In each main we place a damper and connect a damper motor to the damper shaft. This damper motor is wired into an electrical circuit with the thermostat commanding the zone. The damper remains closed *at all times* except when the zone calls for heat. When the zone thermostat calls for heat the damper motor opens the damper and air flows through the zone ducts and into the block of rooms. When the zone thermostat is satisfied the damper motor closes the zone damper and the air supply to the block of rooms stops.

Equipment Needed

The thing we are interested in, of course, is the control system and the control apparatus needed to make this plan operate. To control the system we will need as many thermostats as we have zones; we will need a damper motor for each supply zone duct; we will need some instrument to stop and start our fan; we will need a low limit control to stop the fan should the air get too cold; we will need instruments to operate draft and check doors on our furnace.

Stack Fire Control

In this connection mention will be made several times in the following discussion of bonnet control of our fire. This is done to avoid confusion and is not to be taken as a recommendation. We found in previous discussions of control systems that a highly advantageous location for the instrument which controls our fire or acts as a fire high limit control is in the smoke pipe. This applies just as emphatically to all fire limit controls discussed in this article. The smoke pipe position has the advantage of recording a true condition of the fire and is not affected by changes in air temperature due to the fan starting and stopping; is not affected by radiant heat; and is not subject to differences in casing temperature. Some little experimentation may be required to establish the smoke pipe temperature corresponding to the bonnet air temperature we select as the "ceiling," but once selected the setting need not be changed.

In the next article we will show how zone control divides itself into three general systems. The similarities and differences will be discussed in detail.

Research Residence Facts

(Continued from page 26)

"drops" and "rises" that were necessary in placing the ducts to provide for maximum head room. These changes in elevation of the flat ducts were particularly necessary at the places where the ducts were led up, over, and across the cross-beams of the house structure. In this connection it may be

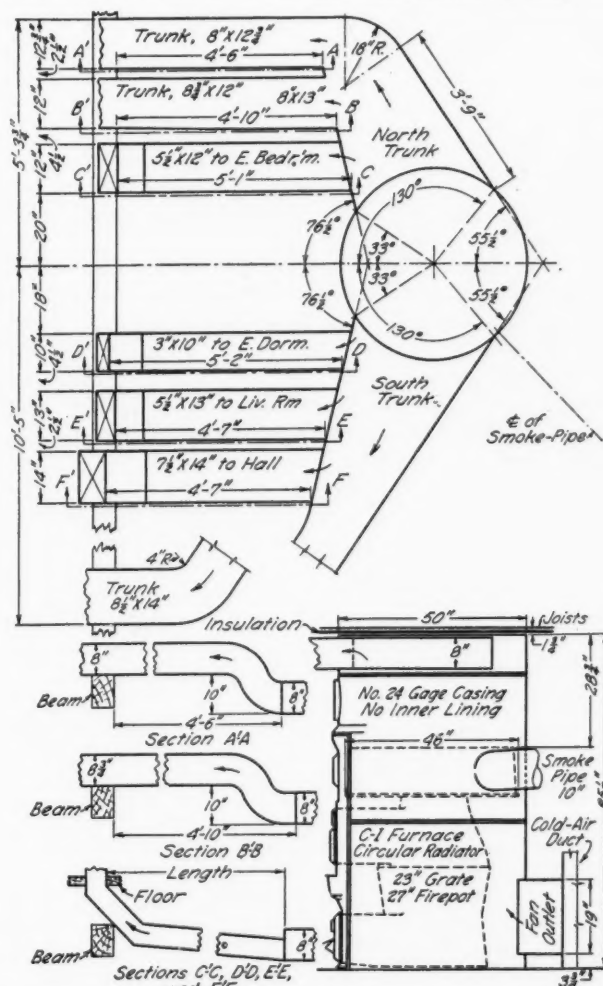


Fig. 4—Details of trunk take-offs and furnace casing for the forced air system, showing the high bonnet and method of taking ducts across floor beams.

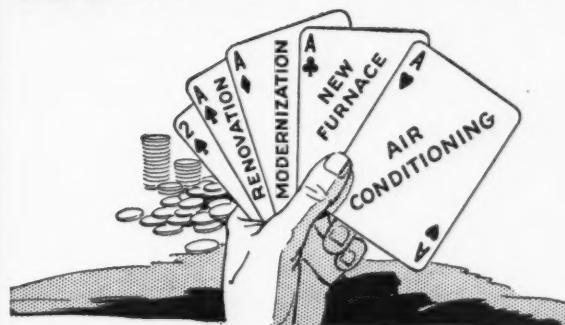
well to emphasize that in any house plan submitted by the dealer or installer to the engineers of a furnace company, all beams, and directions of joist spacings should be carefully indicated.

Fig. 2 also indicates where fairly sharp bends, abrupt dips, and sudden changes in direction in the ducts were found necessary to avoid soil pipes, posts, laundry chutes, duct connections, and other obstructions, that are common to all installations.

c. Length and Size of Ducts

The length of leader pipes in a gravity installation is limited to a maximum of approximately 15 feet, although under some conditions it is possible to use slightly greater leader lengths. In a forced-air system, however, the maximum length of duct permissible is several times that in a gravity plant. In fact, the maximum duct length is dependent upon such factors as the motive head

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Air Conditioning! New Furnaces! Modernization! Renovation! Four cards that can't be beat and you're holding 'em. What a sweet spot to be in this fall and winter with the National Housing Act pouring out 500 million in Government money and manufacturers all over the country throwing all their advertising weight behind the "modernization" drive and the public eager to fix up their homes. The Warm Air Heating Industry, with you as a local authority, has the best chance to share in this new purchasing power—a better chance if Emerson Air Conditioning Equipment is recommended and installed.

For long years of Trouble-Free Service install . . .

EMERSON

Multi-Speed FURNACE BLOWERS

only Multi-speed Blower with 2-speed Automatic Bonnet Control

One furnace manufacturer says: "Our dealers prefer to install Emerson Blowers and Fans because of the low cost of installation — and the absence of motor setting and belt troubles."

Another writes: "The compactness of your Air Washers and Filter Units makes an easier installation and more satisfied customers."

And another: "Emerson Blowers are easy to install, easy to adjust, excellent for summer cooling, and for all 'round dollars and cents value are the best money can buy."

Why not take the word of experienced furnace installers and air conditioning authorities? Go after the air conditioning prospects in your territory with Emerson Equipment and reap the reward of thoroughly satisfied customers as well as satisfactory profits. Write for complete information.

WRITE FOR CONSUMER ADVERTISING PLAN

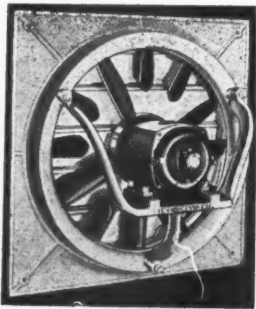
The EMERSON



ELECTRIC MFG. CO.

New York ST. LOUIS Chicago

Leaders in the Fan and Motor Industry Since 1890

INTERNATIONAL "SILENT" FANS**A SUPERIOR LINE OF
PROPELLER FANS FOR
INDUSTRIAL and ATTIC
VENTILATION**

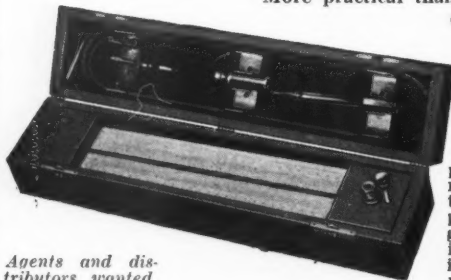
Give higher c.f.m. of free air—particularly efficient against static resistance.

Write for complete information on the International line and selling help.

INTERNATIONAL ENGINEERING, INC.
DAYTON OHIO

AIR CONDITIONING METER

More practical than a draft gauge or anemometer.



Agents and distributors wanted.

It reads velocities as low as 140 ft. per min. No complicated figuring to determine C. F. M. Special pitot tube furnished for taking total and static pressures. Eight graduated readings for each .01 inch pressure and velocity. Full range 0 to .5.

Firelands Manufacturing Company
206 Citizens Bank Bldg. - Norwalk, Ohio

**SUPREME
HUMIDIFIERS**

**Electric Controlled
For your furnace jobs.**

Dealers' Cost \$11.40.

Includes humidifier, electric valve and water line connections.

HUMIDISTAT—\$8.70

110 Volts—60 Cycle.

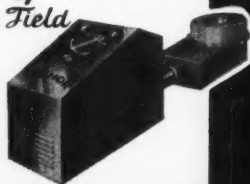
On oil, gas or fan installations, spray operates only when furnace is heating.

**SUPREME ELECTRIC
PRODUCTS CORP.**

79 Mt. Hope Ave., Rochester, N. Y.

**Anchor
KOLSTOKER**

Best engineered stoker on market today. *10 Years Ahead of The Field*
Attractive design appeals to eye; economy and performance appeal to purse. Easily installed in any heating plant now in service. Designed for homes, churches, green-houses, hotels, apartments, schools, laundries, dry-cleaning plants, factories, store-buildings, etc. Made in 17 sizes; complete coverage from homes to 400 h.p. boiler plants. Tremendous sales possibilities for wide awake distributors and dealers. Write for full information.



ANCHOR STOVE and RANGE CO. INC.
NEW ALBANY ESTABLISHED 1865 INDIANA

available to force the air through the ducts, and the magnitude of the air temperatures at the registers and bonnet. It is of interest to note that in the residence plant the equivalent length of duct to the first story sun-room was 63.5 feet, whereas the equivalent length of the duct to the second story northwest bedroom was 66 feet. These lengths are by no means exceptional, and in some types of installations can be greatly exceeded.

The size of the ducts in a forced-air system can be decreased to some extent from those necessary for a gravity plant, provided sufficiently high air velocities are used, and motive head is available at the fan.

d. Increase in Efficiency at Bonnet

Previous tests with forced-air circulation in the Research Residence had indicated that when air quantities exceeding those possible with a gravity plant were circulated over the heating surface of a furnace, the efficiency of heat transmission was increased. This increase in bonnet efficiency was not, however, accompanied by any marked decrease in fuel consumption due to the fact that much of the heat lost from the casing and smoke-pipe in the gravity plant was reabsorbed into the house.

It is evident that every possible increase in bonnet efficiency is desirable since a greater amount of heat will then be delivered directly to the room through the register rather than indirectly by means of vagrant losses. This will then result in a more even distribution of the heat to the various rooms, without overheating in any one room. Figs. 4, 5, and 6 show the fan housing installation in the Residence and the duct arrangement by which the air delivered by the fan was passed over the heating surfaces of the furnace.

e. Filtration of Air

The use of air filters having a fairly high resistance to the flow of air is possible in a forced-air system where sufficient motive head is available to move the air through the system. The location of the filter box in the return duct in one of the early installations in the Residence is shown in Fig. 6.

f. Use of Sidewall Registers

From the standpoint of the home-owner the presence of floor type registers and cold air grilles in a much used portion of the floor space is extremely annoying. In the Residence forced-air installation efforts were directed toward the elimination of floor registers and grilles, wherever construction features permitted. Figs. 7 and 8 show the main return grille located in the hallway stair risers and the box connection in the basement. This particular location, although not necessarily recommended for all installations, was selected because it was the only available location in the central hallway where sidewall registers could be placed. It is of interest to note that both of the grilles shown were effective in drawing in the air and no "dead spots" on the face of the grille were found.

The use of high velocities in the register faces on both the warm air and cold air sides of the

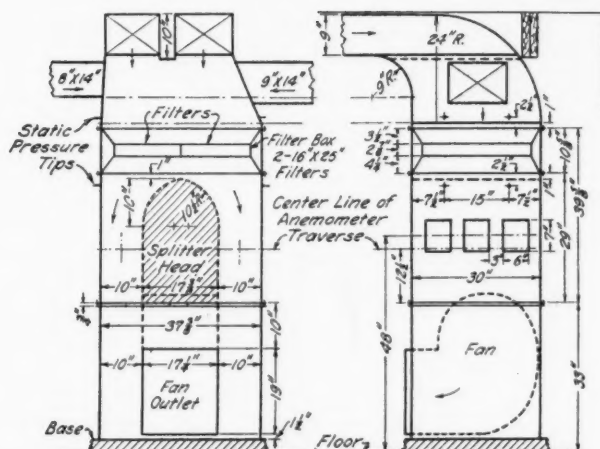


Fig. 5—Details of the cold air return and fan housing for the forced air system; showing single outlet fan.

system also permit the use of smaller and less conspicuous registers than are common with gravity systems.

In the case of the Residence installation all of the warm air registers used in the former gravity system were retained, as shown in the table in Fig. 2. As a consequence the register air velocities were lower than if smaller registers had been used.

Summarizing the possibilities inherent in the forced-air system, we find that the following objectives can be partially or fully realized if desired by the home-owner and installer:

- Less restrictions on the location of the furnace in the basement.
- Increase in available head room in the basement.
- Increase in length of ducts and decrease in size of ducts.
- Increase in efficiency at bonnet.
- Air filtration by use of air filters.
- Use of sidewall registers (or baseboard registers) for both warm air and return air.

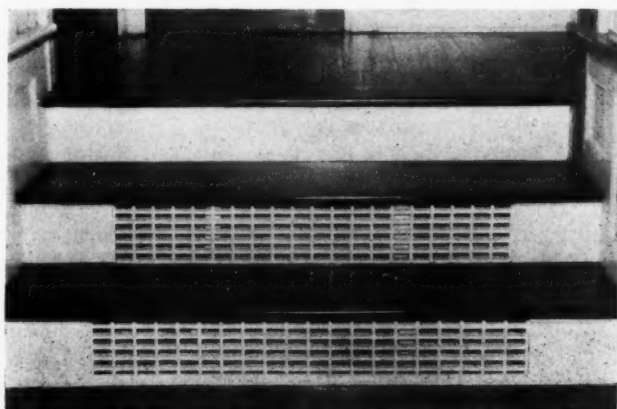
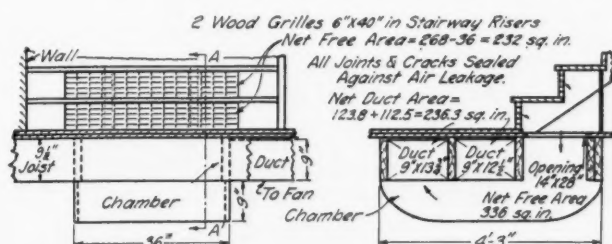
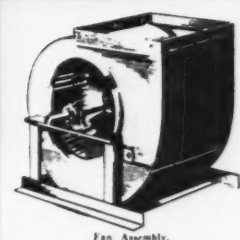


Fig. 8—Photograph of the cold air return grille in central hallway.

FAN WHEELS, ASSEMBLIES

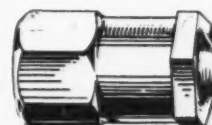
and CONDITIONING
EQUIPMENT that
make your sales easier



Fan Assembly



Double Mulchblade Wheel



Straitway Nozzle.
PATENT PENDING

CLARAGE has much to offer you as a source of supply for furnace fan wheels, complete fan assemblies or air conditioning equipment.

We have been in this business almost a quarter century. Clarge products are the result of experience, research and sound engineering. And the line is complete, with suitable types and sizes to meet every capacity, operating speed and service condition.

Many leading furnace manufacturers have standardized on Clarage. It might pay you to do the same. At least investigate! **CLARAGE FAN COMPANY**, Kalamazoo, Michigan.

CLARAGE

Air Handling and
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**Mr. DEALER
CONTRACTOR**

The basis of Your business is Good Will

Selling quality merchandise that produces complete customer satisfaction is like adding a new salesman to your force with each sale.

Cook Heat Control is quality merchandise and—at a low price.

More than 65,000 satisfactory installations.

Write today for full information.

New low prices make it possible to sell a Cook control with every new or repair heating job.

COOK ELECTRIC COMPANY

**2700 Southport Avenue
Chicago**

Manufacturers of

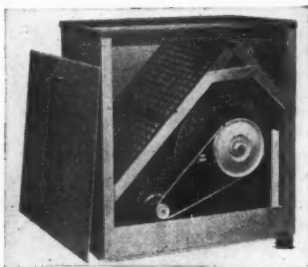
Thermostats, Furnace Switches, and Controls for Air Conditioning Equipment.

Name

Street No.

City..... State.....

\$52.00 A REAL BUSINESS-GETTER



This New Low Priced LAU BLOWER

Complete with filters, motor, furnastat, canvas connections, drive and blower cabinet.

(Other sizes proportionately priced)

Write at once for complete information.

Manufacturers' Agents: Write for proposition. Some territories still open.

LAU HEATING SERVICE, Inc.
Dayton Ohio

Sell the

BRUNETT PATENTED HEAT UTILIZER

The latest improvement in fuel saving—

Will Increase Your

... SALES

... PROFIT

and Will Save Your Customers 25 to 50% of Their Fuel Costs

WRITE TODAY FOR DETAILED INFORMATION

BROWN SHEET IRON & STEEL COMPANY

Pioneer Welders of the Northwest

964 BERRY AVE. Nestor 7137 SAINT PAUL, MINNESOTA

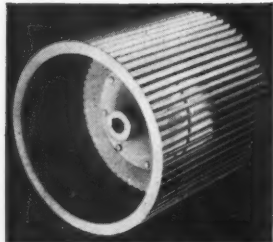
for Registers

WATERLOO DIFFUSER
FOR AIR
specify Waterloo

Concealed duct openings, due to angle of louvers.
Write for illustrated catalog
The WATERLOO REGISTER CO., Waterloo, Iowa
Also 2211 First Ave., Seattle, Wash.

ARC-WELDED WHEELS

and Scroll Housings



for furnace blowers, air-conditioning units, stokers, oil-burners, etc. Always dependable, reasonably priced. Let us quote on your requirements.

Write for proposition on full air conditioning line.

U. S. AIR CONDITIONING CORPORATION

2105 Kennedy St. N. E.

Minneapolis, Minn.

Pioneer Makers of Complete Air-Conditioning Equipment

Winter Care of Air Conditioners

There are a number of precautions which should be taken in preparing an air conditioning system for the inactive winter season, according to L. G. Huggins, Technical Supervisor of Westinghouse Air Conditioning Dealers. The most important of these are:

Store Refrigerant

The refrigerant should be removed from the system and stored in the liquid receiver of the condensing unit. With a compressor standing idle for a long period of time, the oil on the face of the seal may be dissolved by the refrigerant, leaving this seal face dry and the possibility of refrigerant escaping at this point is greatly increased. A new charge of refrigerant will greatly exceed the cost of having a dealer service the machine.

Drain Water

All water should be removed from the condenser, and in the case of water-cooled compressor, from all cooling jackets. Many condensing units are built with spiral coils so arranged that water will not drain from them completely by gravity. Therefore, the safe procedure is to blow all water out of the cooling coils by means of compressed air.

Many condensing units have automatic water regulating valves which are normally closed when the condensing unit is not in operation. It is usually possible to remove the valve seat so that water can be readily blown out. Unless this valve is opened, it will not be possible to completely remove water from the system.

Disconnect Water Supply

The safest procedure after water has been removed from the condenser is to disconnect the water pipe leading to the condensing unit and cap this pipe. This precaution will prevent some unauthorized persons tampering with the water valve during the winter and accidentally admitting water to the condenser.

Remove Fuses

The electric power and control circuits to the condensing unit should be opened to prevent accidentally starting the unit during the winter. This can usually be accomplished effectively by removing the fuse from the safety switch, and tagging the safety switch calling attention to the fact that the circuits are disconnected and should remain disconnected until the apparatus is started again.

Wipe With Oil

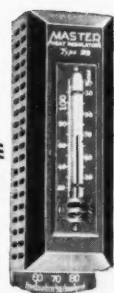
All unpainted iron or steel surfaces of the condensing unit, such as couplings, shafts, and other bright parts, should be wiped with an oily cloth to provide a thin film of protecting oil to prevent rusting during the winter.

Cover Unit

A cover of heavy paper, muslin, or similar material should be placed over the condensing unit and securely tied into place. This cover will keep the unit clean and free from dust or dirt.

Tag It

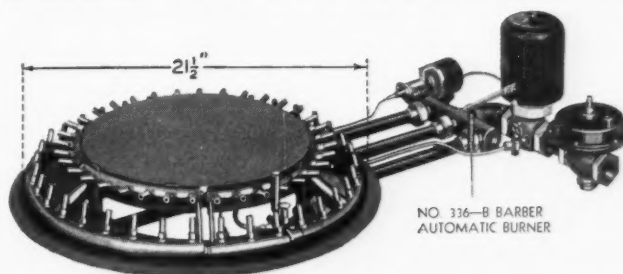
A tag should be tied to the condensing unit, telling the owner that this unit has been shut down for the winter. The tag can show the firm name, address, and telephone number, to facilitate calling a service man to put this unit back in service and properly adjust it for the cooling season next year.

NEW \$13.50
to Dealer
**DAMPER
REGULATOR**Type B-22
Two-
Position

Sturdy, quiet, efficient, low-priced for the volume market. Has small four-pole 16-volt induction motor. Small transformer is mounted outside housing, with approved cord and plug. Basement switch. Listed as standard by Underwriters Laboratories.

Made by the Manufacturers of the famous Type B-14, the original gradual control heat regulator.

WHITE MFG. CO.
2362 University Ave.
St. Paul, Minn.

**MASTER
HEAT REGULATOR**• **Why Barber Burners** •
SELL and STAY SOLD

TAILOR-MADE to suit and fit the grate dimensions of round or oblong furnaces or boilers. Insure proper scrubbing flame action on side walls of firebox. Equipped with Klixon Safety Pilot No. C-1888 for positive and accurate control. Listed in the A. G. A. Directory of Approved Appliances.

Superior performance means economical, care-free heating—lasting satisfaction for both Dealer and Customer. Special designs for air conditioning systems. Write for illustrated Bulletin and Revised Prices on these newly improved Burners.

The Barber Gas Burner Co.

3704 Superior Ave.

Cleveland, Ohio

BARBER Automatic JET GAS BURNERS

• for Warm Air Furnaces,
Steam and Hot Water Boilers •

**Each Installation Means a
Satisfied Customer!**

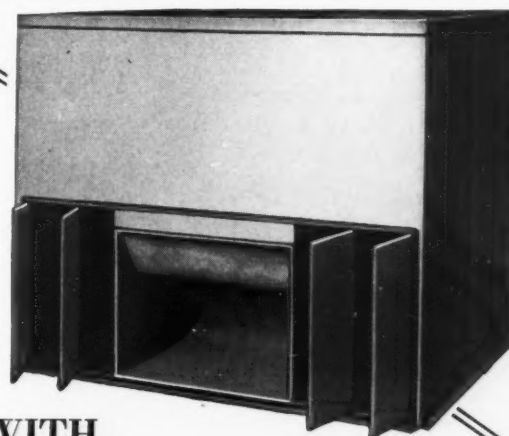
It pays to install Blower Type Air Packages and other AIR CONTROLS heating accessories, not only for the nice profit in each job but because every installation is followed by complete customer satisfaction.

AIR CONTROLS units have won their way into the confidence of thousands. Typical of the line is the

**BLOWER TYPE AIR PACKAGE WITH
MILES AUTOMATIC LOUVRES**

These louvres have established a great reputation. Wherever installed, they promote *safety* by leading off surplus heat and preventing over-heating dangers, and they insure *economy* by causing the blower to run less frequently—conserving fuel—preventing heat waste in the basement—sending more heat upstairs.

Furnace "breathing" is eliminated. Modified air circulation is continuous. Better heating results are certain—at less cost—so it's no wonder the customer is pleased.



Let us tell you more about AIR CONTROLS.
Write today for complete information.

SALES
REPRESENTATIVES
WANTED

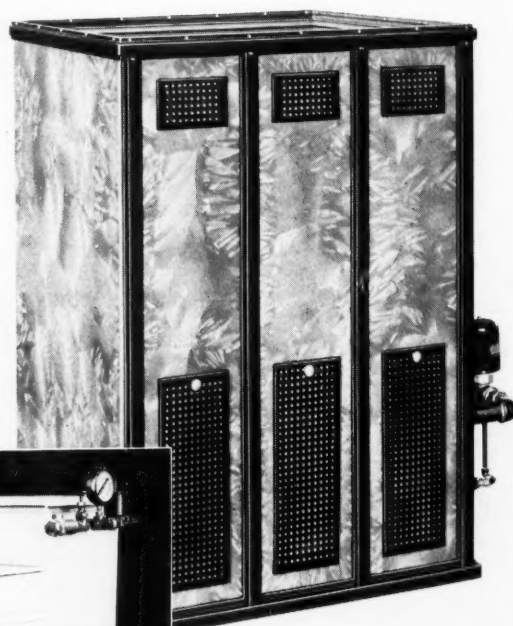
GOOD
TERRITORIES
AVAILABLE

**Air
CONTROLS INC.**

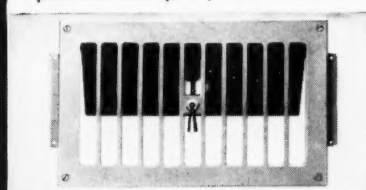
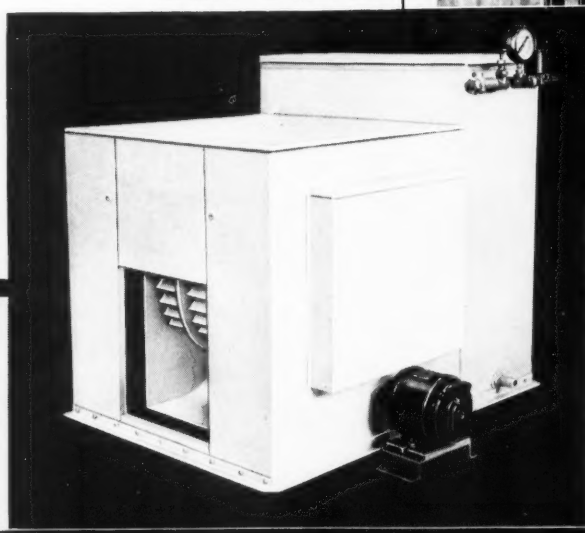
Successor to the Warm Air Furnace Fan Co.
1935 W. 114th Street, Cleveland, Ohio

How Inland Sheets Have Helped in Air Conditioning

Below: Air conditioning unit
for homes—of Inland Steel



Gas-burning furnace given attractive appearance and quality with Inland Steel



Register stamped from Inland Sheets

THE "made-weather" industry offers an example of how Inland keeps pace with the most modern needs for steel.

Back when man attempted to do nothing about the temperature of the air except to endeavor to keep warm, furnace and stove manufacturers found Inland a satisfactory source for steel. And now manufacturers and installers of the equipment which promises to make weather man-controlled in home and office find valuable help at Inland.

They secure the results of most modern equipment, of minute care, of experience not only in the making of steel to difficult requirements but in its application. INLAND STEEL COMPANY, 38 S. Dearborn Street, Chicago, Ill.



1500 tons of Inland Galvanized Steel Sheets were used for ducts in the new Chicago Post Office.

INLAND

ABLE SERVANT OF THE CENTRAL WEST

STEEL

Sheets Strip Tin Plate
Plates Structural Piling

Rails Track Accessories
Bars Rivets Billets

An American Artisan
Survey

Code Authority Committee Reports

The accomplishments of code authority committees vitally concern every contractor in the industry. Many important problems must be worked out and cooperation between committees is helpful. This section records the latest operations of typical committees. Your reports are invited.

Philadelphia

A meeting of all contractors in the Philadelphia area is scheduled for early attention to deal with the problem of giving more service to contractors operating outside the city and county. Code matters in the area are going ahead at a very rapid pace. Up to the end of November a number of complaints had been settled and progress has been rapid.

Beginning the first of December three inspectors will be put out. These inspectors have been in training for two weeks and their duty will be to secure information which will give the correct status of each shop. The plan will be to have the inspector carry a supply of the Code Compliance Check shown herewith. A copy will be left with the contractor to be filled in and a carbon copy for mailing to the code office.

The Philadelphia area bid depository is working nicely. In order that contractors can get a thorough understanding of the operation a series of questions and answers have been put into printed form and are being distributed as rapidly as possible.

(Editor's note—Believing many committees and individuals are interested in such bid depository questions we print here the Philadelphia pamphlet.)

1. Q. Must a copy for all bids for work in Philadelphia County, amounting to \$100.00 or more, be filed with the "Bid Depository" on and after September 17, 1934?

A. YES—No matter to whom the bid is given, General Contractor, Industrial plant, Real Estate Agent, Trust Company or Bank, Home or building owner, agent or tenant.

2. Q. If any awarding authority, as mentioned above, asks for a bid and

awards the contract at once, and there is apparently no other bidder, must a copy of the bid be filed, if \$100.00 or more?

A. YES—There may be other bids unknown to you, as often happens.

3. Q. If two separate and distinct bids are asked for on the same property, or on separate parts or different work under our Code; say \$85.00 for the roof and \$35.00 for shingling back bay window or other work, is this considered as one bid to be filed or two bids and NOT to be filed?

A. If the total of bids amount to \$100.00 or more on the SAME property the total bid must be filed.

4. Q. If a sheet metal contractor gives a sub-bid to a roofing contractor or vice-versa, to include with his bid, or with any other contractor governed under our Code, does the roofer or other contractor who asks for the sub-bids file the total bid for all work, or only for his part of the work, and the sub-bidders each file their bids if each amount to \$100.00 or more?

A. Any contractor under our Code who asks for sub-bids from other contractors must file the total of all bids, as given to the owner or agent of the property, AND the sub-bidders must file their sub-bids also, if these amount to \$100.00 or more, with the proper amount of stamps attached.

5. Q. Is it necessary to file approximate prices?

A. NO—An approximate price is not a bid.

6. Q. After a bid has been filed and the job awarded should the successful bidder notify the "Bid Depository"?

A. YES—And at once (Rittenhouse 1349).

7. Q. Why is it necessary to notify the Bid Depository when a job is received as filed?

A. To complete the records of each job as quickly as possible and for the protection of ALL bidders on ALL jobs filed against selling below cost, etc., as provided in the Code. Quick action makes for better service.

8. Q. If A General Contractor or Contractors have requested a number of sub-bids on any building or structure based on a definite specification for any work covered by our Code and the job is awarded to any General Contractor, and this fact is known by any sub-bidder, what is the next step to be taken by any sub-bidder?

A. As soon as it is learned that the general contractor has been awarded the contract for the entire work, a sub-bidder should notify the "Bid Depository" (Phone: Rit. 1349) giving the name and address of the general contractor, then the Bid Depository will verify the award; open and tabulate all bids deposited with the Bid Depository on that specific job, and mail a copy of all the tabulations to all sub-bidders of record on that job. All tabulations to be mailed under first class mail and together and at one time to insure, as near as possible, a uniform delivery of the tabulations.

9. Q. When are bids opened that are given to other than General Contractors?

A. When a bidder notifies the "Bid Depository" that the contract has been awarded or after 90 days, unless otherwise requested.

10. Q. What is the procedure when bids are made to a general contractor or others based on different specifications which originate with the individual sub-bidders?

A. As soon as the sub-bidder is advised that the SUB-CONTRACT has been let he should advise the Bid Depository. The Bid Depository will verify this and thereafter tabulate the bids and forward them to the interested bidders.

11. Q. Are stamps to be placed on re-bids?

A. NO—But re-bids must be marked as such on the envelope.

12. Q. Are oil burners and accessory equipment to be considered a part of the bid in determining the amount of stamps to be affixed?

A. YES.

13. Q. Should suggested alternate bids be filed with the main bid?

A. YES—But in separate envelopes, as alternates shall not be opened until the sub-bidder has been awarded the alternate.

14. Q. To what extent should stamps be affixed to bids which are broken down into different sections and alternates are mentioned?

A. Only on the primary or main bid.

15. Q. Are Stamps to be affixed on EXTRAS when installed after the original bid is made and the order received?

A. NO.

16. Q. Should stamps be affixed and bid filed to a confirmation of verbal bids?

A. YES—And the Code provides that an exact record of ALL bids must be kept.

17. Q. If bids are to be financed by a financing company should the financing charges be considered a part of the amount of the bid?

A. NO—Affix stamps and file copy for the amount of the bid without the financing charges.

18. Q. Where are bids for work outside of Philadelphia County to be filed?

A. Bid Depositories for outside of Philadelphia County are being established. Apply for specific information to the Phila. Code Administration Office, Room 708, 1600 Arch Street, Phila., Pa.

19. Q. If you know of any shop owner not filing bids, what should you do?

A. Notify Code Administration office at once, such shop owners are violating the Code and the Law.

20. Q. Where are stamps obtainable?

A. At the Bid Depository, 1600 Arch Street, Room 708.

21. Q. What amount of stamps should be attached to bids?

A. Bids of \$100.00 to \$500.00, one 25c stamp; bids of \$501.00 to \$1,000.00, two 25c stamps; bids of \$1,001.00 to \$2,000.00, three 25c stamps; bids of \$2,001.00 and over, four 25c stamps.

22. Q. What is the method of submitting duplicate bids?

A. An exact copy of bid must be submitted to the Bid Depository in sealed envelope plainly marked on the outside with the following:

(a) Name of firm submitting bid.

(b) Name and location of job.

(c) Date and time original bid is to be submitted to the awarding authority.

(d) Name or names and addresses of awarding authorities receiving the enclosed duplicate bid.

23. Q. Should special Bid Depository envelope be used for filing bids?

A. YES—Special envelopes are furnished by the Bid Depository when stamps are purchased.

24. Q. When are duplicate bids delivered to Bid Depository?

A. In all cases duplicate bids shall be delivered to the bid depository not later than the time the original bid is physically delivered to the awarding authority.

Transmittal of duplicate bids through the U. S. Mail is acceptable and if postmarked not later than the time when the duplicate bid is due at the bid depository, delivery thereto

within the specified time is considered to have been effected.

Fred U. Ritter,
Secretary-Treasurer.

National Committee

In its weekly news letter the National Code Authority Committee deals with the matter of the one per cent assessment. The letter remarks:

Many shop owners look upon assessments as being retroactive—but they are not. The making of an assessment is merely requiring a payment in October 1934 to provide funds in the treasury of an amount of money equal to 1 per cent of the volume of business done May 25th to August 25th, or during the first quarter of our Code. In many Codes, it was based on the year 1933 or some other period. The quarter selected by us is merely the measuring stick to gauge the fair proportion each member pays. Had we used some previous period, many would have said "but we have so little business now—we want to pay on present sales." In many areas 1% of volume May 25th to August 25th to less than 1/10 of 1% of some previous quarter.

If the volume done in the quarter billed and paid for produces enough money to satisfy the entire budget to January 25, 1935, as some optimists predict, we would not have to make another assessment until January. Most of these optimists fail to realize that if one firm gets a job and others do not, naturally the one who does, on any plan of payment would pay more and should.

One local board proposed a block rate of 75/1000 of 1% of average annual volume of past five years. This would penalize the low volume of each block and could not be approved because all members would not be paying the same equitable share. Besides to try to get past figures is hopeless, except in a minority of cases.

Ever since January of this year, members of the Roofing and Sheet Metal Industry knew they were going to have a code and copies were broadcast with "cost formula" listing an item of "code costs." Other assessments on codes by other Trades gave them some idea. They knew they had to register contracts. Registration fees are retroactive to all contracts taken since May 25th of \$2,000 or more; since October 9th on jobs of \$1,000 or more.

This is a current assessment or subscription not retroactive although based on a known volume, for the quarter of May 25th to August 25th. Any member can place this first assessment as well as his voluntary contribution of \$5 to "pre-code ex-

penses" into his October overhead to be absorbed and added to jobs done in October and November and include in estimates.

W. S. Hays,
Executive Manager.

Sheet Metal Industries

A bulletin dealing with the advisability of holding a similar conference between sheet metal contractors and roofers is being mailed by the Roofing and Sheet Metal Industries Conference committee. Contractors are asked to express an opinion on the following questions. If interested send your expression to the committee at 644 Drexel Building, Philadelphia, Penna.

Conference Questionnaire

A. Where shall the Conference be held? Some say alternate between Chicago and New York, so 1935 is Chicago year, unless majority favor some other location. Cincinnati and Cleveland have been suggested.

B. What dates should the Conference be held in January or February?

C. Have conditions improved so that a general conference will be well attended by members from all over the country, or should it be confined to delegates from all associations, and regional, state and local Code Administration Boards? Will many travel to a convention from the distant points?

D. Should there be held Zone Meetings in the eleven Code Zones first? This would gather together the greatest number of members, as many cannot yet afford a long trip. From these meetings, delegates would learn problems confronting the different areas and thus develop a National Program for the Conference and its branches that will be valuable to all attending their various association and group meetings at the Conference. Also valuable work could be done interchanging ideas on Code Enforcement.

E. While the Code brings about for the first time financial support of every roofing and sheet metal contractor in work of promoting fair trade practices, there are things to be done beyond bid depositing, checking bids to avoid below cost sales and violations of the Code. How can they be done best?

F. FHA and HOLC are beginning to put money into warm air heating, roofing and sheet metal repairs, renewals and replacements. Even waterproofing could gain some business. Instead of letting this business go to the unemployed carpenters and others than members of Roofing and Sheet Metal Contracting Division the Industry needs to get together locally and nationally to fight for its rights and maintain its prestige as the recognized and proper channel for such work, if the loans during their life are to be protected by work of responsible contractors. What shall we do about it?

Letters



From Readers

Too True!

Chicago—We wish to compliment you on your main editorial in the October issue of your publication, in which you come to the defense of the salesmanship and the business ability of the average dealer in the furnace field.

We have long been of the belief that the manufacturer who "damns" the dealers of his product is really admitting his own gross shortcomings. We have to take an industry the way we find it and try to make it better. We do not believe these people who are doing the ranting would be any different than the dealers about whom they complain, if they were faced with the same circumstances and conditions.

You doubtless will find some interesting reading along this subject in the accompanying statement of our sales policy, which explains very carefully why we believe these dealers are going to win out in the competitive struggle.

—T. C. Russell.

We Agree

Newburgh, N. Y.—We want to tell you how much we appreciate your editorial in the current issue of the *AMERICAN ARTISAN*.

We happen to have two warm air heating jobs right now, one a gravity job and the other a complete air conditioning unit, which are good examples of how a selling organization, without practical experience, runs into trouble.

On one of these jobs a "selling" organization quoted a price only a little more than two-thirds our price on a job which required a new furnace, with some additional registers and a large amount of additional cold air area.

We *know* their price could not possibly have included the amount of duct work needed to make a balanced job. We are absolutely sure that they would not have put in the required amount and that they would not have known how to go about getting it in if the owner could have compelled them to put in enough cold air return area to balance the job.

On the air conditioned job (replacing an old gravity furnace) conditions were met which we are sure could not have been solved by the glibbest of selling agencies.

On neither of these jobs was it possible to follow the layouts made by the factories.

These are good examples of why heating and air conditioning should be done by mechanics who know how the work should be done instead of by "selling" organizations who have little, or no, practical experience.

We believe the greatest danger confronting the air conditioning industry is the sale of air conditioning by "selling" organizations instead of by practical mechanics and heating engineers. We believe the next greatest danger is entrance into the air conditioning field of outsiders who have no background of heating experience.

We do not believe that the manufacture of automobiles, electric equipment, speed boats or radios qualifies any manufacturer to turn out good air conditioning units and to advise intelligently with the installers of his product as to how to avoid complications which come up in every old building and in many of the new ones.

Failure to do this will result in a black eye to the air conditioning industry.

Your editorial is exactly right as heating and air conditioning plants should be sold by those competent to install them properly.

—H. A. Daniel.

Thank You, Mr. Skinner!

Arlington, New Jersey—A few weeks ago three copies of your magazine came into my hands. I want to tell you how much I have enjoyed reading them. Each copy has a fund of information of great interest to anyone interested in air conditioning.

In the September issue I was much interested in the layout of the Ford duct system. A warm air duct 4 by 66 inches, I believe is unheard of. This rather knocks theory into a cocked hat since we are told the width should never be more than four times the depth. Well! It must work; if it

did not Mr. Ford would rip it out and try something else. I see where the code has got to be changed.

(Editor's note—Not at all, Mr. Skinner. There are several things about the Ford installation we wouldn't recommend generally. It is far better to stick to the established rules if possible. The Ford house is not lived in 365 days a year.)

—F. W. Skinner.

We're Sorry, Mr. Meder

Cleveland, Ohio—Just received your latest issue and it reminded me to drop you a line in regard to the *ARTISAN*; I must say that I have always looked forward to receiving your issues, but not any more.

What became of the old issues before air conditioning came in. It seems that air conditioning is about all your articles are about. It takes, as they say, a Philadelphian to understand them.

I believe in air conditioning and install them, but I find the *ARTISAN* lacks the schooling it takes to understand your articles for the average old time tinner.

I remain in favor of the old fashioned articles about furnace and sheet metal work.

—A. Meder.

Thanks Again B. F. J.

Philadelphia—I have just had an opportunity to read your October issue last evening and found it full of interesting matter. New thoughts and lots of information intensely interesting and useful. Thanks.

"We Lay an Egg" was very good—true and right to the point. It takes a man who has done some scouting about to know the truth. Can you imagine the state of mind of the dealer who receives a continuous stream of advertising material in every day's mail and has a steady stream of salesmen calling to tell all about their newest conditioner, controls, heaters or what not? Most of them have changed their firm a month later. I am glad someone had the frankness to tell the truth.

—B. F. John.

..the problem corner

Suggestions On The October Smoke Pipe Problem

By F. K. SKINNER

In your October issue, page 56, the editors have asked for more information in regard to Mr. R. D. K.'s question.

My furnace smoke pipe experience for many years was similar to hundreds of other house owners, about every two years I had to get a new one. White, salty spots with a drop of water in the center would appear during the summer when there was

a mercury switch that starts or stops a fan motor.

I use rice coal in the pot stove; the whole arrangement works to perfection. About a ton of this coal will give us all the hot water the family needs for the summer. When the furnace is started I have a coil in the fire pot that supplies the hot water during the winter. There is heat enough from the pot stove to prevent any dampness

"Williams" C. I. Pipeless Furnace Jan. 14, 1933 Day Cloudy

A. M.	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00
Register Temperature..	98°	106	98	116	160	183	152	138	130	126
Ret. Air Temperature..	62	62	60	60	62	65	65	66	66	66
Outside Temperature...	27	27	27	29	30	32	32	33	34	36
Room Temperature....	66	66½	66	66	70	74	75	74	74	74
P. M.	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00
Register Temperature..	124°	122	122	122	120	119	118	117	116	115
Ret. Air Temperature..	66	66	66	66	66	66	66	66	66	65
Outside Temperature...	35	36	36	37	41	39	36	35	34	33
Room Temperature....	73	73	73	73	72	72	72	72	71	70

no fire and the cellar was more or less damp. In a short time you could stick a finger through the spot. I usually bought the stack galvanized. Size asked for was 24-gage, but it was often 26. As the furnace is 20 feet from the chimney it was quite an item to renew so often.

One year I had the pipe made from 24-gage sheet copper. I knew this would not rust out, but it proved to be little better than the galvanized iron, as the flue gases set up a chemical action and the copper soon became as thin as a piece of paper.

My next move was to get 16-gage Armco iron. I had it rolled into a 9-inch pipe, then riveted it together and put it in place. I then bought a pot stove and connected the 6-inch pipe from that about 2 feet above where the 9-inch comes from the furnace.

This makes near 28 feet from pot stove to chimney. On the hot water pipe from the pot stove I connected a damper regulator, but instead of opening or closing dampers it operates

during the summer, also, the smoke pipe is kept warm. It is seven years since it was put in, and it is as good today as it was the day it was put in.

In this house there is a heat loss of 108,884 B.t.u., according to the A. S. H. V. E. Guide, 1933. It is frame, two-story and attic, seven rooms and bath, 12,327 cubic feet heated.

A Williams pipeless C. I. furnace is used (24-inch grate). A pipeless has some good points but more bad ones. We have lived with it for thirteen years and feel we know it well.

Last winter I made a test to find out some things I wanted to know. At the time the test was made I was using Buck coal. The thermostat is in the dining room, about 10 feet from the register. The warm air delivery is 24 inches in diameter. The over all register is 36 inches by 36 inches. The thermostat starts or stops a fan motor. It is located at the 5-foot level. During the test the temperature of one room only was taken. The table shows what we got.

Box Lining

American Artisan:

Please let me know how you would recommend installing 10 by 14-inch fire door tin sheets on the inside of boxes which are 4 feet wide, 4 feet deep and 5 feet long. The lid must be lined also (see my sketch.) These boxes are to be used for storing hay used in packing glass ware. Each lid is suspended by a fusible link to permit the lid to fall shut should fire occur.

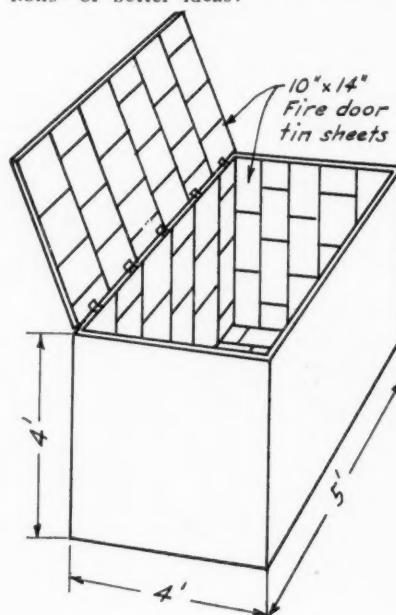
J. C. G., Indiana.

Reply by

Several Chicago contractors experienced in making up products such as you describe suggest that you lay the tin sheets with flat locked seams just as you would in covering a door, but that you make the bottom a little longer and wider than the true dimensions of the box. This extra length can then be turned up to form side and end seams a few inches above the bottom proper.

You can make your sides two or three inches shorter than the true length of the side. Make the ends a few inches short of the true width of the end, also. Then turn the edges for a flat lock seam. Make a corner section with edges turned for a flat locked seam and push this corner section down over the locking edges of your short side and end sheets. Pound the seam tight and you will have a solid corner and a workmanlike job.

Have any readers different suggestions—or better ideas?



Healthful Air

American Artisan:

Will you be kind enough to give us your viewpoints on the questions listed below and any other information of value.

1. What are the advantages to health, if any, of passing air over a steam or hot water coil as compared to passing air over a direct convector heater? Is air more healthful when heated by a steam or hot water coil than when heated in a furnace?

2. What is the relative fuel consumption, assuming equal efficiencies, between the two above systems?

3. What degree F. must air reach before it becomes injurious to health?

4. Assuming a limit control set at 200 degrees and a properly sized fan, what approximately is the temperature of the outside of the castings where the air strikes in a gas fired air conditioner?

H. T., Missouri.

Reply By The Editors

We take it from your letter that you are after information relating to the contention that air warmed in furnaces is injurious to health by reason of being heated to high temperatures.

In answer to question No. 1, we can say that there are no advantages or differences in heating air directly through a convector or by heating the air by means of a heat transfer section. Air heated in a furnace may rise to temperatures of 350 degrees, which is not injurious to health, while air heated by transfer sections seldom exceeds 212 degrees or the temperature of steam.

In answer to question No. 2, we do not know of any data on relative fuel consumption and efficiencies as both boilers and furnaces are practically the same, ranging from 60 to 75% for coal-fired units and running up to approximately 83% if gas-fired.

In answer to question No. 3, we may say that air temperatures are tied up with humidity and very hot, dry air is injurious, but is found in all types of heating systems. We do not believe that you can heat air to such a high temperature that it is injurious in any of the present heating systems.

In answer to question No. 4, we do not have any data on the temperatures of castings but we would assume from tests we have run in the last few months that the casting temperature will be approximately that of the stack temperature and in this case will range from slightly over 100 degrees to as much as 600 degrees F. According to

our tests, when you use a limit control set at 200 degrees bonnet temperature you will have approximately 450 degrees stack temperature unless you are blowing air by the castings at high velocities in which case this relationship stops and you may get high stack temperatures with low bonnet temperatures.

Supplementing our letter of March 17 in answer to your question No. 4, "With the limit control set at 200 degrees what is approximately the temperature of the outside of the castings," we should have added that the temperature of the castings will, of course, depend upon the velocity of the air which is passing by—the higher the velocity the lower the temperature and vice versa.

We might also add that on pages 84 and 85 in Bulletin No. 141 of the University of Illinois Investigation of Warm Air Furnaces and Heating Systems, which can be purchased from the University for 85c, four charts for casting temperatures on coal fired jobs using anthracite and bituminous coal and gravity flow of air are shown. While these charts are not designed to give bonnet air temperatures they do show for various combustion rates the relation in temperature between firepot section, combustion chamber, radiator section and ashpit section and without having any data to the contrary we assume that these relationships will hold pretty uniformly for fan work inasmuch as the charts for gravity necessarily show increasing velocities of air as the combustion rate increases.

Then our correspondent wrote—

We are very much interested in your last paragraph particularly your statement that high velocities may result in high stack temperatures with low bonnet temperatures. We would like to have any chart showing velocities over castings together with their resultant stack temperatures and bonnet temperatures.

And We Replied

There is not very much data available on the comparison between high stack temperatures, low bonnet temperatures and velocity of air through the casings. The statement in our previous letter was based upon observations in various test houses now under way and we do not have any means of charting casting temperatures. However, we do hope to have by the end of this heating season some information on the relationship between air velocity and stack temperature according to various combustion rates.

As a specific answer to your question, we refer you to Bulletin No. 246 of the Illinois Engineering Experiment Station, pages 56 and 57, where the University has charted a comparison between flue gas temperature at various combustion rates for gravity circulation and for a one fan installation using a bonnet type fan. The chart indicates that at combustion rates between two and three and one-half pounds of coal per square foot of grate per hour the fan decreased the flue gas temperature at the smoke collar approximately fifty degrees. The University states that this chart indicates that with increased velocity of air through the casings more heat was absorbed from the castings resulting in lower flue gas temperatures at the smoke collar and at the top of the chimney.

So far as we know, the University has not conducted similar tests for a pressure blower using high velocities.

Domestic Stokers

American Artisan:

Can you furnish data on some reasonably priced, practical domestic stoker? Is there such a thing as a successful stoker that will work with soft coal?

We would not care to take any agency proposition, but we do believe we can swing a sale or two here for stokers. Please give us a list of good stokers meeting these specifications. What is your personal opinion (candid) on stokers that will not require a special grade of coal and that will use soft coal?

C. W. H., Pennsylvania.

Reply by The Editors

The most complete information on stokers for domestic or industrial use is contained on page 93 of the Annual Directory Number of AMERICAN ARTISAN. We do not know which of the firms listed make stokers especially for soft coal nor do we have any information on the price range but, generally speaking, we believe that the stokers manufactured in the Middle West are for soft coal while most of the eastern-made stokers are designed primarily for Anthracite.

The stokers listed are also of the under-feed and over-feed types with most of the stokers using the under-feed principle.

If you are interested in securing specific information on a stoker suitable for the job you discuss in the letter we suggest that you get in touch with the following firms: (list mailed).

ASSOCIATION

Activities

Fox Valley, Illinois

The Fox Valley Furnace and Sheet Metal Contractors Association has launched a series of educational meetings for the coming winter. Under the guidance of President Jack Stowell, who formerly addressed contractor groups all over the country in the interests of the Trade Extension Development Committee of the National Warm Air Heating Association, the first meetings will be devoted to discussions of the Standard Code.

On November 12 the first meeting on the code was held. Each member was given a layout of an average bungalow (see drawing herewith) with the conditions of the project included. Here are the specifications and the outline of the problem to be solved.

Figure the STANDARD CODE requirements for this house.

Make a complete warm air heating system layout on the above plans, use a red pencil for warm air runs and a blue pencil for cold air returns.

Estimate the complete SELLING price for this Heating system. Use the Ass'n "New Furnace Estimate Sheets" for this purpose. For your own information you should divide this SELLING price into material COST, labor COST and GROSS PROFIT. Use the "Basis of Ar-

iving at Cost and Selling Prices" sheet.

DATA:

One story new building.
Frame construction.
Tight floored attic.
No weather strip, insulation or storm windows.

WINDOWS:

No. 1 are 24x24—2 lights.
No. 2 are 18x24—2 lights.
No. 3 are 24x24—1 light.

OUTSIDE DOORS:

3' 0"x7' 0" over all casings.

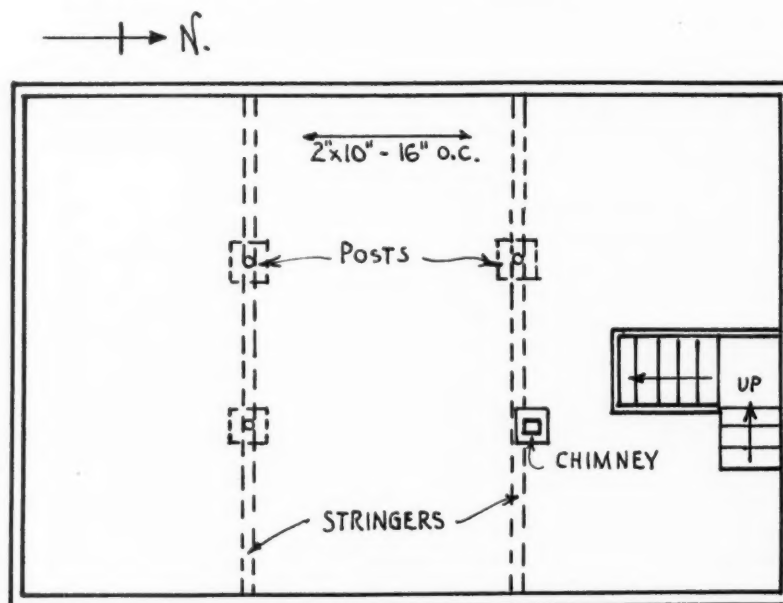
FIGURE TO HEAT AS FOLLOWS:

Inside temperature to be 70° F. when outside temperature is 0.

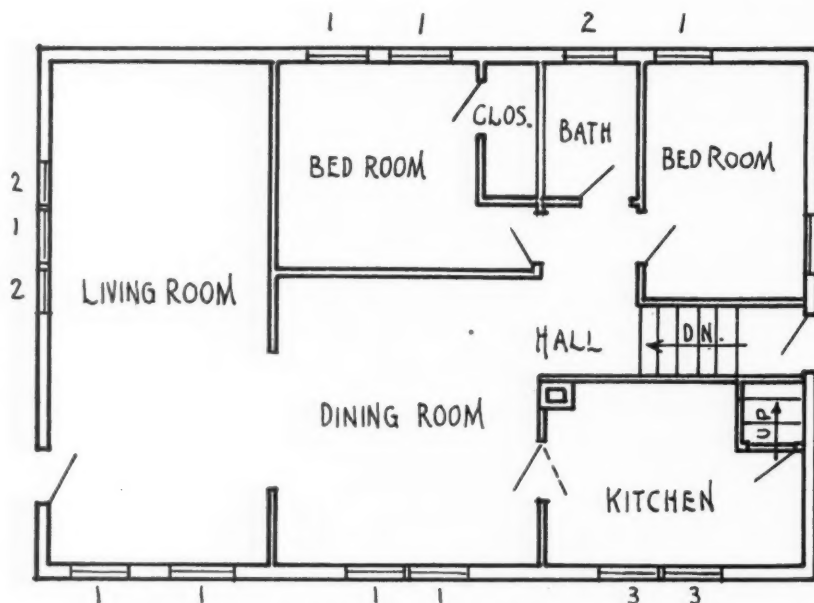
FURNACE: Cast iron, coal to be used as fuel. 9" smoke pipe.

SCALE:

$\frac{1}{8}$ " equals 1' 0". (Irregularities may occur in printing, use the following for checking.)



BASEMENT PLAN



FIRST FLOOR PLAN

Living room—11' 0"x24' 0".

Dining room—14' 0"x13' 0".

Kitchen—13' 0"x9' 0".

E. Bedroom—10' 0"x10' 0".

W. Bedroom—8' 0"x11' 6".

Bath—6' 6"x5' 0".

Hall—8' 6"x5' 0".

CEILING:

First floor—9' 0".

Basement—Floor to joist 7' 0".

WARM AIR REGISTERS:

Bath & Kitchen—Floor registers.

All other rooms—Baseboard registers.

COLD AIR GRILLES:

Steel, oak finish, as needed.

Members were also given copies of the Standard Code estimate sheet familiar to all contractors. This estimate sheet was used to determine pipe sizes for the job.

The association has prepared for members' guidance a New Furnace

Association Activities

Estimate sheet and a Furnace Repair Estimate sheet on which fair prices are listed. The prices shown on this sheet were used to price the job.

NEW FURNACE ESTIMATE	
NAME _____	DATE ESTIMATED _____
ADDRESS _____	DATE PROMISED _____
WORK AT _____	ORDER TAKEN BY _____
NATURE OF WORK _____	TERMS _____

	20"	22"	24"	26"	28"
CAST FURNACE	\$80.00	\$100.00	\$120.00	\$130.15	\$176.15

STEEL	"		\$
_____	8"	WALL AIR RUNS WITH FLOOR REGISTER	8.75.
_____	9"	" " " " " "	8.88
_____	10"	" " " " " "	9.97
_____	12"	" " " " " "	14.13
_____	9"	" " " " " " 8.00.	10.48
_____	9"	" " " " " "	17.48
_____	10"	" " " " " "	15.28
_____	12"	" " " " " "	18.07
_____	10"	" " " " " " DOUBLE	15.28
_____	12"	" " " " " " "	19.76
_____	3/4" DOUBLE FLATS	" " " " " "	7.28
_____	3/4" I	" " " " " "	8.10

EXTRA FOR BRASS-OVERSE			
_____	1 1/2" COLD AIR RUNS WITH OAK STEEL FACE		13.40
_____	10"	" " " " " "	15.44
_____	12"	" " " " " "	17.77
_____	20"	" " " " " "	20.44
_____	22"	" " " " " "	24.94
_____	24"	" " " " " "	27.90
_____	26"	" " " " " "	33.97

EXTRA FOR C. A. PANS _____ LBS.	120# @ 25¢		3.00
ROD CUTTING _____	SHRUB L. NO. HEADS _____		
_____	DOUBLE _____		4.50

(USE 3 FOR _____ FLOOR REG. BONES			1.00
NEW BLOS.) _____	STEEL C. A. FACES _____		1.50
_____	WALL STACK _____		.60

SMOKEPIPE - (SEE ATTACHED SHEET)

LABOR TO INSTALL SMOKEPIPE _____

TEARING OUT OLD FURNACE @ 25¢ PER LBS _____

WHS _____

These prices may be of interest to others and are shown on the sketches.

Before the members discussed the problem in detail each member was asked to take the price sheets and figure the job as he would bid on it. Each member was asked to select the furnace size, the square inches of warm air leader pipe needed and establish a selling price. Twelve estimates were submitted. They are given here to show how close were the figures submitted. The estimates are listed by number rather than by name.

Contractor	Warm Air Needed	Furnace Size	Selling Price
1	583	24"	\$287
2	521	24"	305
3	516	24"	299
4	531	24"	305
5	464	22"	271
6	460	22"	230
7	...	24"	285
8	586	24"	325
9	579	24"	299
10	508	24"	291
11	...	24"	294
12	...	24"	286

The association feels that the close range of these figures is truly remarkable and wonders if any other group could show as consistent and favorable a collection of prices.

In the two meetings each detail of the design were gone into with plenty of time for each member to ask questions. The group figured the job as follows—size of furnace required, 24-inch; selling price based on the association's price schedule, \$293.24.

Elmer Borman, Secretary.

[illegible]

Boston, Mass.

The annual meeting of the Master Sheet Metal and Roofers Association will be held January 24, 1935 at association headquarters, 1 Beacon St., Boston. The association will not hold a convention, just a one-day annual meeting as called for in the constitution and by-laws.

John F. Walsh, Secretary.

Du Page County, Illinois

The Du Page County Warm Air Heating and Sheet Metal Contractors Association was organized a few months ago for the purpose of bringing together men in the industry in the county.

Two important matters have been under discussion for several weeks, finally resulting in two resolutions passed at the last meeting. These resolutions, we believe are also of interest to all other associations in the country. The association welcomes correspondence and comment. The resolutions are—

Resolution No. 1

Whereas, the Du Page County Warm Air Heating & Sheet Metal Contractors Association has been established to promote higher standards in our industry and encourage support of the Code of Fair Competition for the Roofing and Sheet Metal Contracting Division of the Construction Code; and

Whereas, this association wishes to enter a complaint against the 1% code assessment due from members of this industry, as being excessive and unjust, and further that it does not conform to assessments levied in other industries; therefore be it:

Resolved, that the Du Page County Warm Air Heating and Sheet Metal

Resolution No. 2

Contractors Association hereby protests such code assessment with the National Code Authority.

Whereas, the Du Page County Warm Air Heating & Sheet Metal Contractors Association has been established to foster and promote higher standards in the Warm Air Heating, Residential Air Conditioning and Sheet Metal Industry; and

Whereas, our industry is plagued by persons making installations, repairs, alterations and adjustments of equipment pertaining to our industry; and

Whereas, the purchaser of such equipment is subjected to health and fire hazards when purchased from unestablished sources; therefore be it

Resolved, that the Secretary of the Du Page County Warm Air Heating & Sheet Metal Contractors Association correspond with all known associations of our industry in the State of Illinois in the interest of soliciting cooperative support in drafting, discussing and presenting an acceptable license law for the State of Illinois, the purpose of which to promote the standard of our industry, and to protect the purchaser of such equipment.

J. E. Peterson, Secretary.

Chicago

The Furnace and Sheet Metal Institute, Inc., Chicago, held its election of officers Friday, November 23. The following men were elected for the coming year:

President—Lewis Drehabl.

Vice-president—M. L. DeWulf.

Recording Secretary—Clarence Rice.

Financial Sec. & Treas.—Peter Reif.

Directors—R. H. Guenther, O. A. Reinhardt, John Novak, Al. Lehmann, Julius Fleishman.

The association has enjoyed an interesting and busy year. The educational program covering mechanical warm air heating has been completed and a new series of discussions covering the application of the Standard Code has been launched.

Clarence Rice, Secretary.

Buffalo, New York

The Buffalo Sheet Metal, Warm Air Heating & Air Conditioning Association regular meetings held in the Builders Exchange have been very well attended. Subjects discussed have included (Furnace Cleaning Policy), (Working Conditions), (Wages and Hours). Members of this association have elected Wm. Eisle and Max Reid to serve on the Labor Board set up. We will have a banquet at our next regular meeting. This banquet will be held at the Markeen Hotel at 8 o'clock sharp, Jan. 4, 1935.

Our vice-president, Wm. Gordon has taken charge of this meeting, in the absence of our president, Leo Olear. Frank Minot has taken the secretary's place in his illness.

We would like to hear from other cities as to how they are getting along with the Code and also their labor setup.

Leo J. Olear,
President.



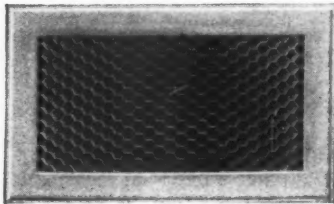
PRODUCTS

For your convenience a number has been assigned each item on this page. A coupon will be found on page 66. Check the items you are interested in and mail the coupon to us. Complete information will be forwarded.

122—Directional Flow Grille

The new Hart & Cooley No. 90 grille is made up of a number of thin strips, formed into a series of grooves and assembled to make a very attractive grille 1 inch deep with $\frac{1}{2}$ inch openings. The grille may be made so as to direct the air in any desired direction—all straight; all to the side; part straight and part to the side, etc. According to the manufacturers, this grille offers the following advantages:

1. The interior of the duct is very effectively concealed.
2. Owing to the curved shape of the grooves, the air is directed as desired with very little resistance.



3. The grille causes no audible noise regardless of air velocity.
4. The grill has an unusually large percentage of free area. The core itself has a free area of 85%. The net free area of the grille depends on the type of frame used.
5. The direction at which the air leaves the grille is permanently fixed and cannot be changed by tampering with the grille.
6. The air can be sent a considerable distance in any desired direction by using sufficient velocity.

The grille is now available with or without any of the standard H & C forced air frames and will soon be available with a valve.

123—Draft Regulator

A new draft regulator, to be applied on the smoke pipe of a warm air furnace, but which can also be used on the smoke pipe of a boiler, hot water heater or other small heating units, is announced by the Walker Manufacturing & Sales Corp., 613 Locust Street, St. Joseph, Missouri.

The draft regulator is of the swinging door type, with a suitable balancing element which is set to maintain a pre-selected draft. As draft varies due to changing flue conditions, the draft door moves in or out keeping the draft in the furnace at a constant point.

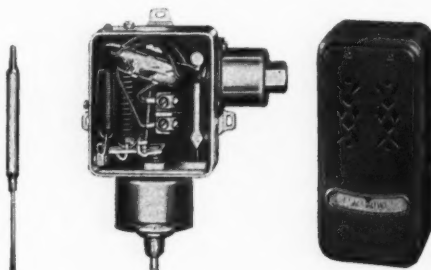
The company has prepared an in-

teresting leaflet showing the results obtained with a good draft regulator and showing various recommended methods of installing the unit. Some interesting information on the savings in fuel cost are also shown in charts. Copies of the leaflet and full information on the product may be obtained from the company.

124—Humidity Control

The ideal amount of relative humidity for comfort and health with normal indoor temperatures is approximately 45%, but if that degree of moisture is maintained in the winter months it almost invariably results in condensation upon the windows and outside walls. For this reason it is necessary to govern the supply of moisture in winter in relation to the outside temperatures and to maintain a relative humidity which is as high as possible for comfort without causing condensation or heavy frost on windows and walls.

Minneapolis - Honeywell Regulator Company is now prepared to supply a compensated humidity control system which will accurately govern relative humidity at any desired differential between inside relative humidity and outside temperature. This result is accomplished by the use of two instru-



ments, a modulating or potentiometer type humidity controller operating in conjunction with an outside temperature controller of remote bulb type. The humidity controller operates in normal fashion governing the supply of moisture at the desired relative humidity in accordance with the setting of the controller. The normal functions are performed until the outside temperature begins to drop. As it drops the remote bulb temperature controller, the bulb of which is outdoors, through its electrical connection with the humidity controller, acts as a limit control. In other words, as the outside temperature goes down

the temperature controller affects the operation of the humidity controller, causing it to call for less moisture and thereby preventing a condition of over-humidity with resultant condensation or frost on the windows and outside walls.

125—Humidostat

A Hold-Heet Humidostat which introduces a new principle and obtains accuracy which is independent of temperature variations is announced by Russell Electric Co., 342 W. Huron St., Chicago. This is accomplished by



the use of Invar metal in the supporting structure. Unlike other metals, Invar does not change in length when heated.

The special wooden column is the responsive member in the Hold-Heet Humidostat. Maximum sensitivity and high mechanical advantages are combined with low unit stresses by employing an unusually large mass of wood. Quick response is obtained by having maximum exposed area with minimum wall thickness. There are actually $5\frac{5}{8}$ square inches of responsive surface.

The Humidostat is supplied with a molded bakelite base and a brass cover finished in statuary bronze. This is a 2-wire quick make-and-break type with magnetic snap action and is rated for 75 watts at 25 volts. Settings are varied by revolving the indicated adjustment at the base. The pilot bulb lights whenever the humidostat is calling for humidity. A standard $\frac{1}{2}$ ampere $2\frac{1}{2}$ volt radio dial bulb is employed.

126—Humidostat

A humidostat for air conditioning control, which will operate humidifying and dehumidifying apparatus, fans, blowers and solenoid valves for steam or hot water ejection, is announced by the Standard Engineering Works, Pawtucket, Rhode Island.

The unit is attractively housed in a small case suitable for use in residen-



tial or commercial work. The hygroscopic element expands and contracts with small changes in relative humidity and through a simple leverage operation turns on and off a mercury switch. The mercury switch is, in turn, wired to and from convenient terminal posts to the humidifying or dehumidifying equipment.

Full information on the new product is contained in literature which the company will be glad to mail.

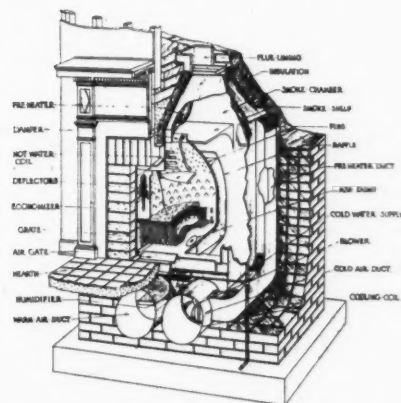
127—Fireplace Heater

A new type of heater, designed primarily for southern climates where there are few basements and so con-

structed that the unit can be placed in an existing fireplace or designed as a fireplace, is announced by J. W. Cornelius, Birmingham, Alabama.

As shown in the accompanying sketch, the furnace consists of a fireplace section, with a grate having 4.2 square feet of area with bottom bars so arched that the grate area is increased without increasing the overall dimensions. Air circulates entirely around the fuel bed and there is a four-member water coil of seamless copper tubing to supply hot water.

Deflectors at each side and on the lower part of the lintel aid in cutting



down radiated heat from the open fire.

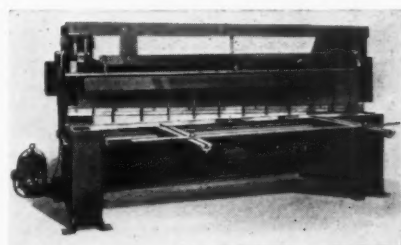
In operation the fire is built in the grate and when the fire is going nicely the fan shown is started. The fan circulates approximately 700 cubic feet of warmed, humidified air per minute through the house and can be con-

nected to small branches. About 20 percent of the air supply is drawn through an outside grille. Air from the fan is filtered and recirculated against the hot castings and over the hot fins. Humidity is supplied by an automatic drip-type humidifier.

128—Enclosed Shear

The new plate shear announced by the Beatty Machine & Mfg. Co., of Hammond, Indiana, is of all-steel construction with all working parts fully enclosed and is claimed to provide instantaneous cutting action at the touch of a button.

No flywheel is employed. The push-button also eliminates the use of a



foot treadle. It is stated that the gap or throat of the shear cannot expand during splitting operations inasmuch as all vertical strains are transmitted to the ram and are not borne by the throat. Large or small sheets may be sheared within full view of the operator at all times, and an adjustable rear squaring gauge is provided with a range of 2 inches from the blade to any specified width.

Here's the Furnace You Should Handle . . . Ideal for Oil, Gas, Stoker-Fired and Forced Air Jobs . . . Efficient with Any Fuel

THE U. S. STEEL FURNACE provides the extra efficiency essential to oil, gas, stoker-fired, and forced circulation jobs.

Its streamlined body and double size radiator deliver 35-50% more warm air, insuring low fuel consumption. Its double welded steel construction eliminates all cemented joints and makes this furnace permanently leak-proof . . . a valuable feature when using oil, gas, or forced circulation.

An expensive burner or blower in an old cast iron or inefficient back radiator steel furnace is inefficient and wasteful. There are many owners of such plants, and each is a ready prospect for a U. S. Steel Furnace, which is more efficient and stands up even better than the special fuel furnaces.

The U. S. Steel Furnace is the *only* furnace that gets the greatest efficiency from every fuel . . . every installation. On every installation it produces more heat at less cost. That fact, proven again and again, gives the U. S. dealer an enormous market for sales.

U. S. PRESSED STEEL PRODUCTS CO.
KALAMAZOO, MICHIGAN





You can be
known as
**The Best Heating Man
in Town**

Series "C" and
"F" Cast Furnaces

Series "S", "D"
and "E" Steel
Furnaces

Series "B"
Gas Furnaces

Moncrief
"Aristocrat" Air
Conditioner

Moncrief Gas
Air Conditioner

Miles Junior Air
Conditioner

It's simple enough. Just install Moncrief Furnaces as well as we have made them. Try to give your customer as good value and service as we aim to give you. It won't be long before you have a reputation that will raise you above price cutting competition.

The Moncrief line is modern, complete in every detail, quality made and fairly priced.

Write for particulars of
the Moncrief Proposition

**THE HENRY FURNACE
& FOUNDRY CO.**

3471 E. 49th St., Cleveland, Ohio

*We supply everything used on
a Warm Air Heating Job*

**MONCRIEF
FURNACES**

and
**Air Conditioning
Systems**



News Items

Company Wants Furnace Department Manager

J. R. Spease, P. O. Box 262, Fairmont, West Virginia, writes that he is looking for a young man to assist and eventually take charge of a warm air furnace department in Fairmont, a city of 25,000 population. Mr. Spease's company has a furnace department which has done a successful business for several years. The company has in mind employing a capable young man, technically trained in the heating game, of good character and habits, who is willing to work for a moderate salary at the start. It is the company's idea to eventually put the man selected in charge of the sale of warm air furnaces and their installation in this vicinity.

AMERICAN ARTISAN will be glad to forward any letters to Mr. Spease or interested individuals may write Mr. Spease direct.

Company Wants Furnace Agency

The Metal Specialty Company, 1806 Main Street, Green Bay, Wisconsin, would like to take the agency for warm air furnaces and oil burners of the high-low fire type. the company will be glad to have correspondence from manufacturers interested in establishing an agency in the Green Bay area.

Open Forum on Air Conditioning

The David Rankin Trade School in St. Louis announces that a program on air conditioning, designed to aid heating men in getting correct knowledge as well as pointing out to these men the possibilities of gaining business opened up to them by the development of air conditioning, is in process of formation.

An executive committee to assist the school in the preparation of a suitable program is announced as follows: Oscar P. Brauer, president of the A. G. Brauer Supply Co.; E. A. Freund, industrial development engineer of the Union-Electric Light & Power Co.; C. A. Pickett, Herman Nelson Corp.; Luke Tiernan, president of the Sheet Metal, Air Conditioning and Heating Contractors' Association of St. Louis and George R. Rodenheiser, superintendent of the Heating and Ventilating Department of the Rankin School.

N. Y. Home Loan Payments Met

With more than \$1,000,000 advanced for home modernization, National City Bank reported recently that those property owners whose first monthly deposits had become due had shown "the best payment record in the history of the bank's Personal Loan Department." There is not a delinquency among these first 513 early borrowers.

The amount loaned to date for modernization by the bank—\$1,001,091—has gone to 1,696 borrowers, an average of \$590 each for a term of 21 months. Because most property owners are doing several types of improvements, a total of 4,602 jobs is involved. According to the bank this has meant employment of several times that many individuals.

The classification of jobs is as follows:

Redecorating (Interior).....	771
Heating	672
Plumbing	581
Exterior Repairs	499
Roofing	456
Painting Outside	440
Remodeling, General	304
Interior Repairs	219
Cementing	195
Lighting	143
Remodeling Bathroom	108
Additional Room	101
Remodeling Kitchen	63

Furnace Discounts Limited to Five Per Cent

An amendment to the code for the warm air furnace manufacturing industry, limiting discounts to five per cent "for cash payment with order or within the usual cash discount period," has been approved by the National Industrial Recovery Board.

With The Manufacturers . . .

Walter Bowe Joins American Sheet & Tin

Walter A. Bowe has joined the general offices sales organization of the American Sheet and Tin Plate Company, Pittsburgh, a subsidiary of the United States Steel Corporation. Mr. Bowe recently resigned as advertising manager of the air-conditioning department of General Electric Company.

B. F. Lagerberg Sales Manager of Premier

Premier Warm Air Heater Company, Dowagiac, Michigan, announce the appointment of B. F. Lagerberg as sales promotion manager to succeed R. M. Marberry, who recently resigned. The company announces continuation of the plan of digging up prospects for dealers by mail handled from the company's office.

Fred Bishop Forms Humidifier Company

Fred R. Bishop, who for the past year and a half has sold the output of the Universal Humidifier Company, informs us that he has severed his connection with that company and has recently organized the Bishop Humidifier Company, and after several months of test and research has placed on the market the Bishop Humidifier and the Bishop Automatic Water Pan Filler. Both products are shown in the circular which is just off the press. Further details and prices can be had by writing the above Company at 8011 Dexter Blvd., Detroit, Michigan.

New Revere Office

Revere Copper and Brass Incorporated, New York City, announce the opening of an office at 804 Tower Petroleum Building, 1905 Elm Street, Dallas, Texas. W. Russell Weil, formerly of their Chicago office, will be the new southwestern district manager.

Working Made Republic Cincinnati Manager

Appointment of Robert J. Working as District Sales Manager in Cincinnati for Republic Steel Corporation was announced by N. J. Clarke, Vice President in Charge of Sales. Mr. Working succeeds W. A. Peck as head of the Cincinnati office.

Formerly in the sales department of United Alloy Steel Corporation at Canton, Ohio, Mr. Working was placed in charge of the Cincinnati district office of the Central Alloy Steel Corporation in 1927. Following the Republic merger in 1930 he was made Assistant District Sales Manager of the Cincinnati office.

Ramquist Joins Register & Grille Mfg. Co.

M. V. Ramquist, formerly of Tuttle & Bailey Mfg. Co., has been appointed representative for the Chicago territory by Register & Grille Mfg. Co. of Brooklyn, N. Y.

Trow A. Warner, also formerly of Tuttle & Bailey Mfg. Co., is general sales manager of the new concern.

New Armco Offices

The American Rolling Mill Company announces the opening of a new sales office in Buffalo, New York, located at Seventeen Court Street Building.

V. L. Conley, Assistant District Manager of the Cleveland Sales District, has been transferred to the Pittsburgh District to function as Assistant District Manager in charge of the Buffalo office.

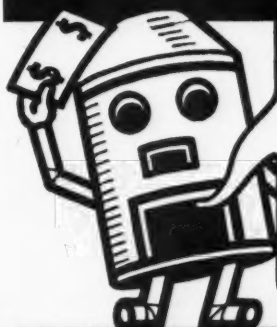
Assisting Mr. Conley will be A. W. Bryant, with headquarters at Rochester, New York.

The territory assigned this new office will include all of the territory in New York State from Utica west.

A new office has also been established in Atlanta, Georgia, in Room 1437, Citizens and Southern National Bank Building.

C. M. Broome, Jr., Assistant District Manager, will be in charge of the office. The new office will serve the states of Florida, South Carolina, Alabama, Georgia, and parts of Tennessee and North Carolina.

VICTOR HEAT BOOSTERS



FURNACE MEN!

READ ABOUT
VICTOR'S
CHALLENGE
OFFER!

**A DOLLAR BILL to any
Dealer who can prove
VICTOR HEAT BOOSTERS
do not sell themselves!**



FLOOR TYPE
LIST PRICE \$5.95



WALL TYPE
LIST PRICE \$7.50

Hundreds of progressive furnace men are adding to their profits this season by pushing Victor Heat Boosters. It's the easy, economical way to solve the common "Cold Room" problem and, once a furnace owner sees it operate, he wants it—and the price is so reasonable that anyone can afford it.

Perfect Results Guaranteed!

The performance of Victor Boosters is so positive that we authorize our dealers to sell it on a straight-forward guarantee of complete satisfaction or money refunded. It can't fail for, regardless of the distance the heat must travel or the number of turns or the size of the pipe, if there is fire in the furnace either style of Victor Boosters will bring up plenty of heat.

You Can't Lose!

We want you to get your share of the handsome profits Victor Heat Boosters make possible. We want you to show this modern invention to three logical prospects—let them try it in their own homes—and if you don't make at least one sale we are ready to pay you a good American dollar for your trouble. You don't have to do any selling yourself—the Victor Booster, by its own startling performance, will make them buy. This offer is open to any recognized furnace man—take advantage of it by mailing the coupon today!

VICTOR ELECTRIC PRODUCTS, Inc.
720 Reading Road, Cincinnati, Ohio

Gentlemen: We want to accept your challenge. Ship us two samples of your Victor Heat Boosters (one Floor type and one Wall type) and complete instructions regarding your dollar offer.

Name _____

Address _____

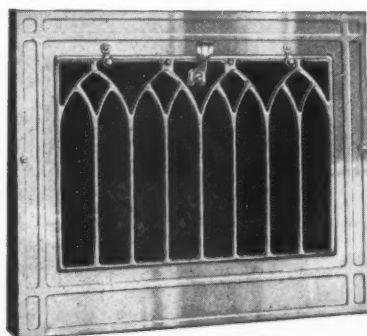
Signed by _____ Title _____

Name of Jobber _____

Dealer discount on Victor Boosters is 35% off list. Orders for direct shipment accepted on C. O. D. basis.

MAIL THIS COUPON TODAY!

Get Set for the 1935 Comeback with these two Leaders

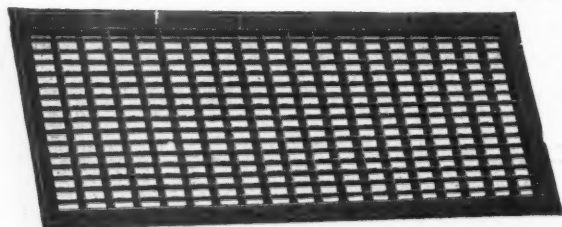


No. 110 BASEBOARD REGISTER

America's favorite 2-piece baseboard register. For those installers who prefer to lap the stackhead over the frame we have a companion series, No. 120, with same attractive face design.

No. 265 "NO-FLEX" COLD AIR FACE

A superior grid-type cold air face. Narrow mesh, invisible corner seams, large air capacity, and several other superiorities recognizable at a glance. NO. 210 "NO-FLEX" FLOOR REGISTER, TO MATCH, AVAILABLE JANUARY 1st.



THE outlook for new building, modernization and repairs is extremely encouraging. Those installers who are set for it, will make a real comeback in 1935.

Don't overlook the importance of finest quality registers. Better design, better construction and workmanship never fail to make a good impression. And the installer that offers them at no increase in cost is bound to have the edge.

The H & C No. 110 Baseboard Register is a proven leader in the field. No. 265 "No-Flex" Cold Air Face has made a host of friends in 1934. It will pay you to get set on these favorites at once for 1935 business. And for all other register and accessory requirements consult the jobber that carries H & C, the most complete line of fine registers ever made.

HART & COOLEY MFG. CO.
CAST AND STEEL  WARM AIR REGISTERS
GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 66. Check the items you want and mail to us. We will forward the information you check.

233—Automatic Humidifier Booklet

A new booklet dealing with the subject of humidification by means of the automatic drip humidifier unit, has been published by the Automatic Humidifier Co., Cedar Falls, Iowa.

The booklet is designed for consumer reading and takes up in sequence the method of securing humidification by means of a bonnet type humidifier which automatically maintains a suitable level of water in the bonnet pan. The results of humidification between 35 and 50 percent relative humidity are pointed out in photographs and text. The dangers of too small an amount of relative humidity, (humidities between 5 and 15 percent) are likewise pointed out.

234—Heat Acceleration Booklet

A new booklet entitled "Heat Acceleration" with the sub-title "what it is and how it differs from heat anticipation" is announced by Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.

The booklet explains the advantages and necessities for automatic heating control in all types of buildings. Some preliminary history of the development of heat control is presented. The subject of heat anticipation, which has been offered as a solution to such troubles as cold seventy and stratification, is covered in detail.

The booklet then takes up the subject of heat acceleration and explains just what this operation is and how it works. Diagrams and explanation of the necessary apparatus for heat acceleration are covered in detail. The importance of heat distribution is indicated by graphs showing temperatures throughout a room plotted against a time and burner cycle of operation. Drawings and text explain the controls used in this system and how acceleration is obtained.

235—Chromium Display Booklet

An interesting compilation of photographs and accompanying explanations showing various decorative uses of chromium metals is presented in the form of a booklet called "Chromium, for Decorative Display and Sign Work." The booklet is presented by the American Nickeloid Co., Peru, Illinois.

A large number of excellent photographs are shown throughout the booklet and cover practically every possible application of Chrome metal. Such uses as the decoration of lobbies, taverns and bars, displays at the Chicago Century of Progress, exteriors of various types of buildings, interior decorations for offices, buildings, etc., the use of chromium as a display background in all types of commercial establishments from restaurants to large department stores, the use of chromium in window displays, the use of bright metals for renovation of existing commercial establishments, etc., are all presented.

Additional pages in the book show many types of industrial and commercial items such as display counters, tables, kitchen and restaurant equipment, signs and fixtures.

243—Humidifier Leaflet

A leaflet containing information on a heat saver type of humidifier is announced by the Minneapolis Air Conditioner Co., 1609 Hennepin Ave., Minneapolis, Minn.

The unit consists of an exterior housing containing an interior heat chamber which is connected to the furnace or boiler and also to the smoke flue. Gases of combustion enter this interior chamber and are baffled to retard flow before entering the chimney. Air from the interior of the house is brought to the bottom of the housing and rising around the interior heat chamber is warmed and humidified by means of a spray mounted in the top of the cabinet. Warmed and humidified air is blown by gravity from the top of the unit through a register located in the house.

Fluxes For Soft Soldering

(Continued from page 18)

many cases, especially on large work, a small amount of corrosion may not be objectionable since it will not weaken the joint or neighboring material to any great extent, but this same amount of corrosion would be fatal on fine work. Several years ago, a large number of coils wound of 3 mil enameled copper wire were found to be defective when tested a few months after they were made, and an examination of the defective coils showed that when the joints between the wire and the heavier terminal were made, soldering flux had dropped on the wire, either from spattering when the hot soldering iron was applied, or from carelessness in handling the flux. Wherever a droplet of flux had fallen on the fine enameled wire, corrosion had occurred, as was

plainly indicated by a few granules of greenish salt in which were imbedded the tapered ends of the broken wire. An analysis of the flux showed the presence of zinc and ammonium chlorides, which would account for the corrosion of the wire.

The flux used in the above case was thought to be suitable for the application, and it, like many other commercial fluxes, bore a name which suggested that it was non-corrosive. Many fluxes are accompanied by advertising matter which is written in such a way that careful study of the wording is necessary to discover that the flux is not absolutely non-corrosive, but only "practically" non-corrosive. The presence of zinc chloride and ammonium chloride can readily be determined by an analysis of a flux, and if either or both of these materials are

present, corrosion may be expected unless the flux is removed after the soldering has been completed. Fluxes containing the chlorides in water or glycerine are readily removed by washing in water, but if petrolatum, or a similar material, is present, some solvent like benzine must be used to remove the flux.

Health Hazards

Complaints are sometimes heard about the irritating effect of fluxes on the skin of the workmen. None of the ordinary fluxes will have any immediate effect on the average skin when they come in contact with it at rather infrequent intervals and the hands are washed as usual. However, in the case of workmen who are continually using zinc chloride fluxes, the splashing of flux frequently causes irritation and sores, so that it will be necessary to protect the hands with a paste or gloves, unless the process can be modified to avoid the trouble.

PERFORATED METALS

Brass, Bronze, Copper, Steel, Stainless Steel, Aluminum, Monel, Zinc, Tin Plate, Lead, or any other sheet material perforated to your order. Perforations in rounds, oblongs, squares and special shapes. Complete stock of brass and tin in small sizes.

Accurate, durable product. Send us your next specifications.

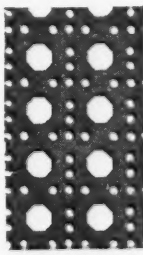
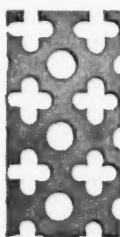
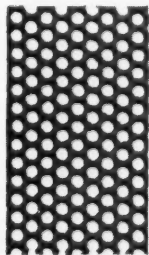
FOR
ARCHITECTURAL
GRILLES

RADIATOR
ENCLOSURES

SAFETY
GUARDS

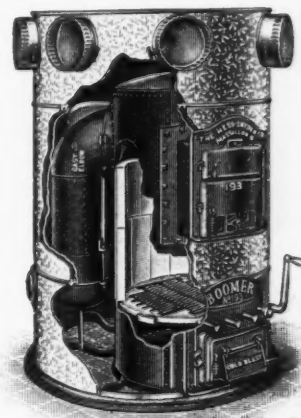
And for all screening
and sizing operations.

Prompt, careful work
Pleasing prices



The
Harrington & King
PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

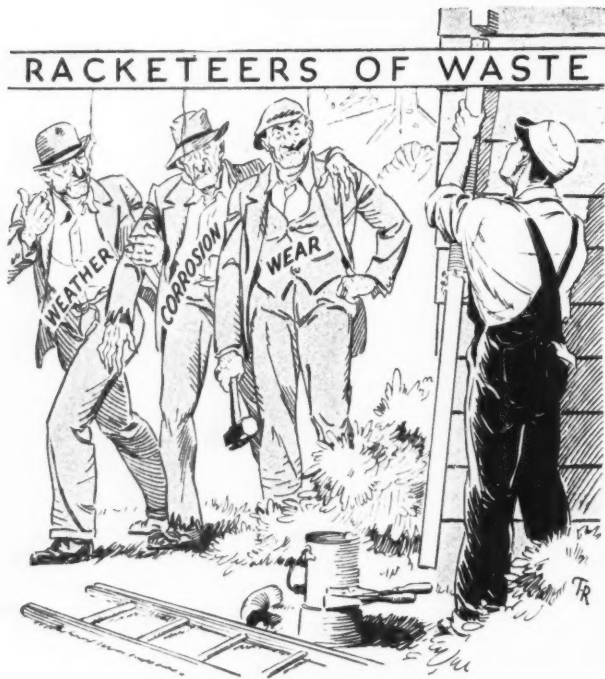
Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.
Massillon, Ohio

RACKETEERS OF WASTE



No place for us here! He's using GOHI

When you use GOHI Sheet Metal, Wear, Weather and Corrosion are defeated, for this fine Pure Iron-Copper Alloy is the longest-lasting, rust resisting, low cost ferrous metal obtainable.

It isn't necessary for you to take chances or experiment when you buy sheet metal. More than a quarter-century of actual on-the-job use in thousands of building projects under all conditions of wear, weather, corrosion and abuse, have furnished the guarantee of GOHI superiority.

GOHI for every building purpose is not only the best sheet metal you can buy but it is also, by long odds, the cheapest, for it gives years of protection and service out of all proportion to its cost.



Details and samples on request.

GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company, Newport, Kentucky.

GOHI

Pronounced "GO-HIGH"

SHEET METAL

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 66. Check the items you want and mail to us. We will forward the information you check.

236—Housing Booklet by Owens-Illinois

A special 16-page booklet for use by the warm air heating industry pointing out to consumers the benefits to be secured through the National Housing Act, is now available according to J. S. Irvine, manager of the Industrial Materials Division of the Owens-Illinois Glass Company.

The booklet, entitled "An Important Benefit You Can Secure Through the National Housing Act," explains in simple language by the question and answer method how the home owner can secure such financial aid as may be required for immediate repair and remodeling of his property. There is next an explanation of how the problem of dealing with the common enemy, dust and dirt, has been solved by the use of air filters applied at the warm air furnace intake.

The booklet then proceeds with an interesting description of the Dustop filter, explaining how each strand of glass-wool in the filter pack is coated with a special adhesive which penetrates the particles of dust it catches, so that they, in turn, catch others.

237—Sheet Iron Primer

Republic Steel Corporation, Massillon, Ohio, announce the fifth edition of "Sheet Iron—A Primer." The book contains 64 pages and is profusely illustrated. In simple, non-technical language it tells a step-by-step story of modern manufacture of sheet iron, tracing production from the iron ore mine to the final inspection of the completed sheets. The book contains gage tables and an interesting glossary of metallurgical terms.

The booklet is known as Bulletin No. 127 and copies will be supplied to any interested contractors.

238—Automatic Control Leaflets

Four new leaflets are announced by Detroit Lubricator Company, Detroit, Michigan.

The first leaflet describes the solenoid valve designed for refrigerating systems. The two-page leaflet gives full information on the design and manufacture of the unit with a table of characteristics.

Leaflet No. 290 covering the self-cleaning nozzle shows cut-away views of the nozzle and its method of operation in humidifying systems. Full explanation of the construction and recommended methods of using this nozzle are contained.

The new differential thermostat for cooling and air conditioning is covered by a third leaflet. Contractors interested in a control system where the inside control units are synchronized with an outside control will find full explanation of this type of control operation in the leaflet.

Leaflet No. 253 covers the combination fan and limit switch for either high or low voltage. A drawing is used to show the construction of the contact points on the inside and explanation is given of the design and operation.

Copies of these leaflets may be obtained from the company.

239—Heat Booster Leaflet

A large size display booklet, which can be given to prospects or shown in the dealer's window covering the use of the heat booster type of fan, has been prepared by the Victor Electric Products Company, 720 Reading Road, Cincinnati, Ohio.

The leaflet is made up in three colors and shows both wall-type and floor-type register fans. Large drawings show the proper application as recommended by the company and explain how the unit operates. Full information on the proper methods of application and a set of specifications is included.

Dealers interested in display leaflets for their windows may obtain a copy by writing the company.

Warm Air Convention

(Continued from page 21)



W. L. McGrath
Past President and Chairman, Code Committee

speaker also reviewed cooling tests using room coolers of the portable type. The results of night air cooling were published in AMERICAN ARTISAN for October and November, 1934 by S. Konzo.

The results from portable room coolers indicated that a unit having

a capacity of approximately one quarter ton of refrigeration per 24 hours is sufficient to cool the living room of the research residence and to also give some cooling effect on the first floor hall, dining room and kitchen together with the living room where too great a drop is not required.

The tests, stated Mr. Konzo, indicate that the best method of operation is to operate the cooler to maintain a maximum room temperature rather than to try and maintain a set temperature differential or a varying temperature differential.

The tests for the summer of 1933 covered use of a 2½-ton refrigeration unit in the basement forcing all cooled air through the regular heating system excepting the third floor dormer and the sun room. Changes were made in the return system to take all return air from the first floor hall plus some outside air at night and under this arrangement a

OFFICERS
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R. M. Judd
H. S. Sharp
C. M. Selby
W. L. McGrath

maximum temperature of 81 degrees was secured with this sized unit.

The speaker brought out the savings possible where night air cooling using the regular piping system and a speeded up fan to give at least nine air changes per hour was used.

The last session of the program was given over to an inspection trip to the United States Bureau of Mines and the A. S. H. & V. E. laboratory where equipment used in conducting tests was shown and explained.

LIBERTY OFFERS

2

Complete Lines

FRONT RANK
TRADE NAME REGISTERED

Where a thoroughly efficient steel furnace is desired the FRONT RANK meets the requirement every time. Models for the modest home or the more imposing one.

MELLOW

Every detail of construction contributes to efficiency and economy of operation. A cast iron furnace which assures 70° humid heat even in sub-zero weather.

When you handle the steel and cast iron furnace lines made by Liberty, you can compete for any job, regardless of price, heating requirements and personal preferences of the buyer.

Send for Dealer Proposition

Write today for complete information on "Front Rank" and "Mellow" furnaces. It costs you nothing and it does point the way to a more profitable business for any dealer.

LIBERTY FOUNDRY COMPANY
ST. LOUIS MISSOURI

370 "SPECIAL"

and SHEET-METAL ROOFS

LOOK down upon the roofs in your community. Single out those roofs that are sheet metal and then make it your business to do the painting job.

And keep this in mind—sheet metal roofs must be painted regularly in order that they continue to protect the buildings they cover. Sheet metal roof painting is business that is constant and profitable.

With the fact that roofs must be painted regularly already established, the question that is important to you is, which paint to use, to do the job most satisfactorily and economically.

We suggest 370 "SPECIAL RED." Here is a paint, the ingredients of which, assure long life and protection and which is being recognized among buyers as an exclusive standard where quality is essential but where economy is stressed.

Other Thompson Products—Alumbrite—the new Aluminum Paint for Wood and Steel and Lin-O-Jap, the Perfect Reducing Oil for All Paint.

THOMPSON & COMPANY
P. O. Box 557, N. S. PITTSBURGH, PA.

President Richardson's Address

As we gather at our Annual Meeting, I cannot help but call your attention to the fact that the last twelve months have represented greater changes than have taken place in any other twelve months in the experience of this industry. Last year we launched the Warm Air Furnace Code which was followed by the Roofing & Sheet Metal Code, the Register Code, and the Furnace Pipe & Fittings Code. We perhaps have been fortunate in having codes which, generally speaking, were more clearly understood, or were easier of performance than was true of codes of other industries. However, be that as it may—the fact remains that the Codes have stood for something in our industry and have really been of benefit to all of us. I know that there is some justification for the arguments of those of you who perhaps feel that the Codes have been a nuisance, that they have added detail to your business, and that perhaps they have not accomplished all that they should. At the same time I feel certain that the vast majority in this room will agree with me that the Codes applying to our entire industry have done more to help us out of the bog of depression than any other one thing could have accomplished in the same time.

As we look forward into the next six months, it is hard to contemplate or to forecast what will be the future developments of codes, of government activities in business and of the effect of both upon the members of this

Association. Those of us who have spent any time in Washington during the last four or five months will agree that the Administration is definitely planning some form of NRA continuance. Undoubtedly by the time June arrives Congress will have voted laws which will carry forward policies and principles, at least, of NRA. It is quite obvious that there is more of an effort being made in Washington to adjust the ramifications of NRA with the necessities of industry and there is definitely a greater tendency to allow industry to regulate itself than existed prior to August of this year. If we agree in principle that there will continue some form of NRA, it behooves all of us to put our shoulder to the wheel, make a Code which will fit our entire industry, and then universally live up to that Code.

There is a very definite necessity for amalgamating or more closely allying the Installers' Code with the Manufacturers' Code. It may be possible to more closely knit the manufacturing codes with the distributing codes. You are all familiar enough with NRA, with Codes, and with our own business—suffice it to say that this Association can serve as a meeting place for all of the problems affecting the various industries and groups within the Association—whether they be manufacturer, jobber or dealer problems.

The Government has taken another step during the last few months—called The Federal Housing Act—which is divided into three parts or

Titles. Title I.—Housing Renovation and Modernization, Title II.—Mutual Mortgage Insurance, Title III.—National Mortgage Associations.

Ever since we have had the pleasure of coming to these meetings we have heard at least one speaker at each meeting discuss the consumer's dollar, where it is spent, how we can get our share of it. We have had speakers in Chicago, Cleveland and Cincinnati, and other places, tell us that their industry was getting such and such percentage of the consumer's dollar; that the way for us to develop our business was to find ways and means of increasing our proportion; that every other industry was making such and such an effort to get their proportionate share and we should educate the heating contractor, the jobber and other types of outlets to get out of their offices and solicit heating business.

As against this it is interesting to note that for the first time since we have had accurate figures and accurate checkups, and since the beginning of FHA activity, we find that heating leads the field. We find that out of the total number of jobs let under the Act 17.71% are heating jobs. To date heating has been at the top and, apparently, is continuing to stay there. By the Consumer's Dollar we mean—the amount of money that the average family has left over after paying for the daily requisites of life, such as food, shelter, clothing, etc.—that which is left over, even though it may be small, are the dollars which every industry is after. In other words, we are getting a greater share of the Consumer's dollar than formerly we had been led to believe we were getting.

Repair Parts for:

**Boilers — Stoves
and Furnaces —
Cast or Steel**

**Quick shipment in Northeastern
Indiana, Northwestern Ohio and
Southern Michigan.**

**Also furnace pipe, registers and
furnace cement.**

Write for catalogue.

SCHLATTER HARDWARE CO.
Ft. Wayne :: Indiana



Typical Uses for APOLLO ChromCopper

Write for Samples of
BRIGHT AND SATIN FINISHES
APOLLO COMPANY
Box AA
LA SALLE - ILLINOIS



Other industries are realizing this. They see the same reports that we see, and concentrated effort is being made in almost every industry. I do not believe that many of us consider landscape gardening as a particularly big industry, and yet we find by scanning the figures issued by the FHA that landscape gardening represents a very comfortable percentage. In the last thirty days landscape gardeners have pooled their interests, calling upon individuals in suburban areas, offering to landscape that street, or that section, at a very nominal cost per home. If we are to continue getting our share of the Consumer's Dollar, we, too, must work together to make sure that the landscape gardener doesn't get paid for his trees before we get paid for a new heating plant.

Many of you will say that the heating report would indicate that more steam or water boilers are being sold. After carefully analyzing the best figures obtainable, I am very proud to state that this is not the case—there have been a great many warm air furnaces and accessories, pipe, fittings and registers installed under the Federal Housing Act. Out of 200 jobs taken under the Act prior to October 15th—and bear in mind that 200 does not represent all of the jobs taken, but just 200 that I could check—over 75 of them were warm air furnaces. It is also interesting to note that 65 were various types of air conditioning equipment. I cannot recall the number of this latter group which were manufactured by members of this Association, but I can assure you that it was a very small percentage.

It is my hope that progress will be

made rapidly so that this Association will represent not only the latest developments in air conditioning but the very best efforts. There is no doubt in anybody's mind that a great deal of this equipment being sold today under the name of heating and air conditioning can be classified simply as gadgets built to do a job in one room or two, and not primarily designed to comfortably and satisfactorily heat a complete home. This Association represents the best judgment and the greatest knowledge in that fundamental necessity. There has not been the finances available to do all of the things in our Research Laboratory in the University of Illinois that your Research Committee and the Association generally would like to have done.

During the building boom following the war, mortgage money was easy to procure, and this money was spent, to a very great extent, in building homes which could adequately be heated by the equipment which this Association has for sale. During the depression, when many of those homes were thrown back on to the mortgage, he found that the equipment that had gone into those homes was not up to specification and the value was not there. He has learned his lesson. It is going to mean that, under the ramifications of Title II, the banks and others who are going to loan money on mortgages are going to check far more carefully than they did during the boom building days, and it is going to be possible for each one of us who are attempting to sell equipment for these homes to have a certain degree of confidence in the fact that the equipment that is specified

will be the material that is put into the homes.

It will well behoove all of us, during the next two or three months, to spend some time with our local banks, trust companies, etc., to the end that they may know of the activities of this Association, the research work which has been done and the value of considering the equipment which can be sold, and is being sold by members of this Association.


Address of Beverly S. King Code Administrator

I realize that all of your Code provisions may not be operating to your liking, that certain rulings that you get from NRA may not be satisfactory, and that questions of compliance have perhaps not been prosecuted with the promptness and despatch that you anticipated, but—you must admit that business is better.

As a nation we have been through several periods of depression such as we are going through now, and have always emerged successfully. But so far as I can remember no one has ever been able to tell us how we ever got out. I venture to say that after we emerge from this struggle many will claim that this plan was of no help and that we would have come through anyhow.

AMERICAN STEEL SHEETS

FOR ALL KNOWN USES



In Industry and Construction

Use sheets of recognized reputation and value. For roofing, siding, gutters, spouting, air conditioning systems, and general sheet metal work — Keystone Copper Steel gives maximum rust resistance.

Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvannealed Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.

Write us relative to your sheet steel requirements. This Company also manufactures U S S STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY of UNITED STATES STEEL CORPORATION

THE VIKING SHEAR IS THE FIRST TOOL IN WELL EQUIPPED SHOPS



The Viking Shear is the key tool in a profitable shop . . . it cuts so clean and so accurately that the work rolls out on schedule . . . and actual costs keep in line with the estimates . . . Viking's long life makes it a good investment . . . for particulars write

VIKING SHEAR CO., Erie, Pa.

V I K I N G

Business is better today than it was a year ago. I am in constant touch with 65 durable goods industries and I am continually told that conditions are steadily improving. Complaints from small units are now comparatively few, they are being helped instead of "put out of business" as they feared a year ago.

An important immediate point for you to dwell on is the fact that most of your factories are actually operating in more than one industry as you yourselves have written the definitions of industries. That means that most of the troubles you are having because of the necessity of operating under codes with varying labor provisions are not due to overlapping of codes, but arise from the fact that most of you are distinctly in more than one industry. As long, therefore, as the small industries retain separate codes, you are going to be confronted with the problem of operating under varying labor provisions and of paying assessments to more than one code authority which seems to be at present the chief sources of complaint. Only one thing will really solve that problem, and that is for code authorities to get together and agree upon uniform labor provisions in similar industry groups.

The question of wage differentials

between the North and the South has always been a bone of contention. It is entirely possible that a differential based on population rather than geographical locations might prove more equitable to industry.

A geographical differential should be examined in the light of whether a population differential might not be provided. Since the number of large cities in the South is much smaller than in the North, certain types of population differentials may have much the same consequences as geographical differentials.

There is more money, more business and a higher standard of labor in Oklahoma and Texas than in Virginia, why, therefore, should Oklahoma and Texas be classed with Virginia as a Southern State and be given the same low wage differential?

As a problematical question would it not be better if a population differential minimum wage rate ranging, let us say, from 30 to 40 cents per hour could be established applying to the manufacture of durable goods, and applied equally throughout the country? I am inclined to believe that we would have much fairer competition within these industries and you would all be in position to make a fair profit.

As long as a company normally in a certain type of industry is free to

step out and manufacture products in another industry, it is only just and proper that such company should abide by the fair trade practices of that other industry whose territory it invades, and it should help support the code authority in that industry. We hope that this will eventually be solved under the new alignment of industry groupings by having master code authorities or at any rate some form of coordinating committee delegated by the individual code authorities to collect single assessments and distribute them equitably. This is something that we cannot do for you, because no part of the National Industrial Recovery Act gives us the power to organize industry. We can only coordinate your efforts and then hope that the separate code authorities throughout industry will get together in these coordinated groupings and settle the problems themselves.

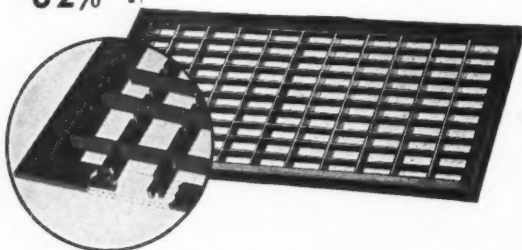
It is questionable in my mind whether Code Authorities should assume any responsibility for publishing a jobbers list. It seems to me that such responsibility should be assumed by the manufacturer selling the jobbers.

If objections are raised by any interested jobber the manufacturer should defend his classification.

Another point is that such a list

INDEPENDENT "Fabrikated" COLD AIR FACES AND REGISTERS

82%



Open
Area

Regular or Special

Independent "Fabrikated" comes regularly in a wide range of sizes and finishes. But if you have not seen what you want, ask for it. We can make it up on short notice.

INDEPENDENT REGISTER
& MFG. CO.

3741 E. 93d St., Cleveland Ohio

For

LOW CELLAR INSTALLATIONS

Specify

FAULTLESS FURNACES

HEIGHT OF CASTINGS

only 53 in. on 24", 26", 28" and 30" pot sizes

only 50½ in. on 22", 20" and 18" pot sizes

—on—

AIR CONDITIONING

or modern Gravity installations

The **SERIES "C" OR "K"**

WITH HEAVY CASTINGS, HIGH RATINGS

and

extensive Heating surfaces

also

OTHER FAULTLESS HEATERS

for standard requirements

ALL SERIES EQUIPPED WITH COGLESS GRATES

and two with **DUPLEX (Dump Center) type**
if preferred.

Faultless Heater Corporation

manufacturer

CLEVELAND, OHIO

changes so constantly that it would seem rather useless to publish it.

The question naturally arises,—why classify customers at all?

Why not give every purchaser a "customer" classification—regardless of whether he is really a so-called jobber or dealer.

Have your prices to customers determined by the amount of purchase, rather than by the present method of jobber or dealer classification.

You all realize that at the present time every dealer can, if he desires, work out a separate organization that will easily qualify him as a jobber, and no Code or set of rules can prevent it.

The question of sales below cost is important.

Good sound products in use cannot be sold below cost. There has to be a margin to take care of invention, research and promotion.

Here and there around the United States in the last twelve months there have been too many evidences that some companies were determined to sell cheaper than the department stores or the mail order houses or anybody else. The impetus has been upon cheaper merchandise.

Manufacturers in desperation have broken their Code laws and have provided this cheaper merchandise. As a

result, a number of them are in bankruptcy and more of them are going there. In any event, no manufacturer can provide cheap merchandise and at the same time keep up invention and progress in these fields. If you are going to beat the department stores and the mail order houses in selling cheap merchandise, there remains no quality market. It is difficult indeed to believe that Americans do not want comfort in their homes, and are not willing to pay for it.

If merchandising policy is to be cheap merchandise at cheap prices it is going to be paid for in one of three ways. Either the manufacturer will pay for it, the consumer will pay for it, or the stores will pay for it. The last two will not. It would seem perfectly obvious that every cheap merchandise campaign put on comes out of the manufacturer.

A word as to emergencies.

Several industries in my office have recently sought to have "an emergency" declared to place a floor or limit below which products could not be sold. The question arises as to what sort of emergency can exist in the midst of the emergency which brought about the enactment of the National Industrial Recovery Act.

You are very likely thinking "and what about compliance?" In most

cases compliance to code provisions can be secured by your Code Authority through the Trade Practice Complaints Committee. At least 80 per cent of complaints filed are settled in this way. The other 20 per cent are sent through to the N. R. A. State Directors, the Compliance Board or to the Government Contracts Section.

If the facts presented are justified and will stand up in Court the respondent is cited to appear before the Compliance Council for trial.

These investigations and trials take time and as a result the Council has been overburdened with cases of all kinds.

It is now planned to set up ten regional Compliance Boards in various sections of the country. One has already been established in Atlanta, Ga., and the others will follow at once. These Boards are in addition to the State Compliance Directors already established.

The cases decided by these Regional Boards will be practically final—very few will be subject to appeal, not more than one in forty at the outside. Attached to each Regional Board will be a Litigation Office consisting of four or five men which decidedly augments our present litigation force. This should give the most rapid action possible.

FURNACE REPAIR PARTS

Made by National are made to fit the job. Parts made to fit only new furnaces will not do as well. "Nothing is obsolete with National."

Send for price list A22 and save.

NATIONAL FOUNDRY AND FURNACE CO.
DAYTON, OHIO

EVERY JOB A PERFECT JOB ... AND DONE IN RECORD TIME



Rubyfluid SOLDERING FLUX

Makes neater, cleaner work and saves time, labor and material. In use for more than 28 years. Your name on letterhead brings you a free trial sample. Judge it then!

Acid Core
Solder
Rosin Core
Solder
Liquid Flux
Soldering
Paste

THE RUBY CHEMICAL COMPANY
74 McDowell Street Columbus, Ohio

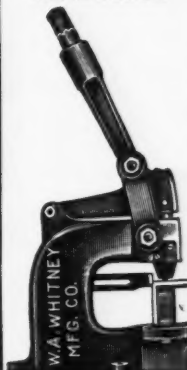
WHITNEY LEVER PUNCHES

No. 4B PUNCH



Length—3½ inches. Capacity ¼-inch hole through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—¾" to 1" by 64ths.

No. 91 PUNCH



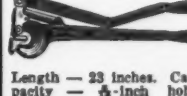
Capacity — ¼-inch hole through ¼-inch, 1-inch hole through ¾-inch and 2-inch hole through ½-inch iron. Depth throat 5-inches. Weight — 82 lbs.

No. 1 PUNCH



Length — 34 inches. Capacity — ¼-inch hole through ¼-inch iron. Punches and dies in sizes from ¼ to 1 by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ¾-inch hole through ¼-inch iron. Punches and dies in sizes ¾-inch to 1½-inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

No. 6 PUNCH



Length — 30½ inches. Capacity — ¼-inch hole through ¾-inch iron; especially adapted for button punching or templet work. Punches and dies ¼" to 1" by 32nds.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber



WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

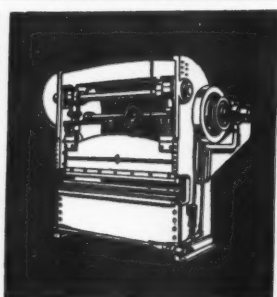
More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON Inc.

CHICAGO MILWAUKEE JERSEY CITY BUFFALO PHILADELPHIA
DETROIT ST. LOUIS CINCINNATI CLEVELAND BOSTON

SHEETS



PRESS BRAKE



HAND BENDING BRAKE

Steel Brakes—Presses—Shears

DREIS & KRUMP MFG. CO.

7404 LOOMIS BLVD.

CHICAGO

Install



ÆOLUS
Improved
VENTILATORS

FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise—no upkeep.

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson, Inc.

3332-52 South Artesian Avenue
Chicago, Ill.

ALL REPAIR PARTS

for FURNACES
BOILERS
STOVES
RANGES

A.G. BRAUER
SUPPLY COMPANY

316 NO. THIRD ST. + SAINT LOUIS
IN STOCK • READY FOR IMMEDIATE SHIPMENT

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 66. Check the items you want and mail to us. We will forward the information you check.

240—ILG Catalog and Handbook

Ilg Electric Ventilating Co., 2850 North Crawford Ave., Chicago, Illinois, announce booklet No. C-50, a new condensed catalog and handbook of ventilating, heating, cooling and air conditioning equipment.

Purposely made pocket size, the new catalog contains practically all the information previously presented in the standard size catalogs and folders issued by the company.

By means of photographs, detailed drawings, tables, charts and explanation, the new catalog presents full information on the company's propeller type ventilating fans with full information on design, construction and proper method of use. Full characteristics of these units, plus information on such auxiliary equipment as automatic shutters, louvers, roof ventilators, kitchen exhaust fans of several types, attic ventilating fans and utility fans are presented. The standard Ilg blowers used for all ventilating purposes are explained in detail with complete tables of characteristics and sizes. Auxiliary pressure blowers, unit heaters and cooling equipment are also shown and tabulated.

241—Air Conditioner Leaflet

An interesting leaflet for consumer reading has been prepared by the Joliet Heating Corporation, Joliet, Ill. The leaflet is entitled "Step Into the Health and Comfort Zone With Comfort Maker."

On the two inside pages of the four-page leaflet the problems of air conditioning are explained in detail. The leaflet points out that in the wintertime 90 per cent of our time is spent indoors. It shows that 80 percent of winter illness is due to poor air and that 60 per cent of our energy comes from the air. Photographs show the effects of too dry, too warm and too cold air.

The last page shows a cut-away view of the warm air furnace air conditioning unit with a table of specifications and prices. Copies may be obtained from the company.

242—Inland Steel Booklet

The Inland Steel Company, Chicago, has published a new edition of their handy booklet, "Sizes We Roll." It is a 64-page booklet and includes size data on all Inland Products except Rails, Track Accessories, and Tin Plate, together with other useful information. Maximum sizes of sheets and strip rolled by Inland are included in this handy reference book for the first time. Another new feature has been added which will make the booklet more valuable: Gage, Weight and Bundling Tables.

AMERICAN ARTISAN
6 North Michigan Ave.,
Chicago, Ill.

Send me more information about the products mentioned in your New Products section. Also see that I get a copy of the following literature mentioned in your New Literature section. I have checked the reference numbers of the items I am interested in.

New Products	New Literature
122	233
123	234
124	235
125	236
126	237
127	238
128	239
	240
	241
	242
	243

Clip this coupon to your letterhead for prompt reply.

Want Ad Sales Campaign

(Continued from page 22)

a week, then drop out for a week, then run a different advertisement for another week, and so on.

On August 8 the first of the series appeared. It read:

FREE FURNACE INSPECTION—

Now is a good time to have your furnace looked over—Be sure it is safe for next winter's use. Offer good limited time. Expert service.

Phone 282. 111 Dean St.
WOODSTOCK HEATING COMPANY

Telephone calls began to trickle in almost as soon as the advertisement was published, for in a city of 6,000 a daily paper is read from line to line and from cover to cover.

Visits into the homes for free inspection of the furnace gave Mr. Ebert and his assistant opportunity to note needed repairs and to suggest changes in the interest of more efficient heating.

About the time that business from this advertisement began to die down, the second advertisement of the series was inserted in the *Woodstock Daily Sentinel*. It read:

FOR SALE—Furnace Repairs for all furnaces. Smokepipe and vacuum cleaner service. McIlvaine Oil Burners. Expert work.
WOODSTOCK HEATING COMPANY

This brought considerable repair work and oil burner pros-

pects. But now the tempo of interest in furnaces was increasing. The first sharp days of autumn brought home the fact to many householders that all signs pointed to a long, cold winter. On October 10, Mr. Ebert decided to talk new furnaces, and price, to-wit:

FOR SALE—Number ONE grade cast iron FURNACES with all modern improvements. All one piece heavy castings. Fully guaranteed. Special at \$43.00. Phone 282. 111 Dean St. WOODSTOCK HEATING COMPANY.

Furnaces were moving now. Someone in the neighboring town of Ridgefield saw this advertisement and there was a call to come and make a price on a new furnace for the schoolhouse there. Several days later the furnace was installed. The stream of repair work, cleaning and the like, kept up nicely, of its own volition, bringing its small, but nevertheless welcome profit.

And so, a week later the price angle on new furnaces was emphasized in the advertisement, together with suggestion that inefficient systems might be improved with small outlay, as follows, (October 29): (*in next column.*)

The success of the classified advertisement in a daily newspaper as a means of reaching

small town and country trade in the heating field depends of course, on whether the medium is widely read, and whether the readers have the power to pur-

FIRST CLASS CAST IRON FURNACES at \$43. Expert heating service for your faulty furnace. Good used furnace \$30.
WOODSTOCK HEATING COMPANY
111 Dean St. Phone 282

chase the article or service advertised.

In this case both requirements, as to reader interest in the medium, and as to purchasing power of the readers, were satisfied. The city of Woodstock, in the midst of the dairy country is made up of quiet conservative home owners, who are accustomed to enjoying modest comfort. They read their local paper faithfully and they patronize their local dealers.

These classified advertisements were continued all during 1932 but were concerned with items for the Christmas trade—washers, electric refrigerators, ironers. Practically the same campaign was used during 1933 and so far in 1934.

Asked if he will continue this method of reaching his customers, Mr. Ebert replied:

"Why not? I have tried direct sales letters, cards, display advertising, house to house solicitation, and have found classified advertising not only cheaper, but more effective, too."

HEATING

REPAIRS

DEALER HELPS ON

REPAIR PARTS

NOW AVAILABLE TO YOU

WRITE or WIRE FOR YOURS

CENTRAL

3935 OLIVE ST.

FURNACE & STOVE

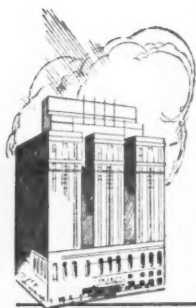
REPAIR CO.

ST. LOUIS, MO.



...HAVE YOU HEARD the one about the traveling salesman?

He went to bed at the William Penn and slept twenty years! Well, maybe that is a little exaggerated. But anyway, the beds at Pittsburgh's number one hotel are so comfortable you don't ever want to get up. The food in the four famous restaurants is equally exceptional, and the prices reasonable. Quiet, well-furnished rooms, \$3.50 single; \$5.00 double, all with bath.



1600 ROOMS . 1600 BATHS

HOTEL WILLIAM PENN
PITTSBURGH, PENNA.



Bellevue-Stratford

The traditional hospitality of the Bellevue is a subject for reminiscence wherever men gather, the world over. Recent complete modernization in decoration and appointments have added even a fresher note to this famous hotel.

Rates are
Reasonable

CLAUDE H. BENNETT
General Manager

IN THE HEART OF

PHILADELPHIA



Group No. 4



MAKE MICHIGAN AVENUE
Your Home When You Visit
CHICAGO

Every comfort, every fine hotel luxury awaits you at the newly modernized Auditorium Hotel. Unusually good food at modest prices.

ROOMS WITHOUT
PRIVATE BATH
from \$1.50

ROOMS WITH
PRIVATE BATH
from \$2.50



Hotel AUDITORIUM
MICHIGAN at CONGRESS CHICAGO

SLEEPY HEAD

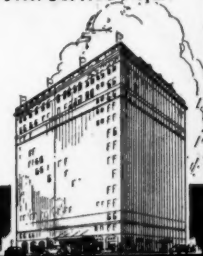


A Real Night's Rest
MELBOURNE
HOTEL

Man, oh man! what a pleasure it is to sink deep in the soft downy bed and really sleep. And how you'll enjoy the tempting food in the Coffee Shop and Dining Room. Even your car gets better service when you stay at the Melbourne.

400 ROOMS
WITH BATH
FROM \$2.50

O. P. GREATHOUSE Manager



ST. LOUIS

LINDELL AT GRAND

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. One inch \$3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS OPEN

OPPORTUNITY—We need first class salesmen and manufacturers agents to represent us on the sale of Only Original Soot Destroyer and Boiler Water Treatment in all open territory. Attractive proposition to the right men. Saginaw Salt Products Company, Saginaw, Michigan.

LARGE MANUFACTURER WITH complete line of furnaces and air conditioning equipment and an exceptional dealer sales plan and finance set-up, wants two more high grade salesmen for Ohio and Illinois. Strictly commission. . . Give full information and experience in replying. Address Key 297, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

Manufacturers Agents

MANUFACTURERS WANTING AD-ditional representation often come to us for names of prospective agents now handling other lines in this field on a commission basis in a definite territory. It will pay you to be on record with us so we can refer your name to interested manufacturers. No charge or obligation, of course. It is a service we render free to manufacturer and representative. Just drop a line that you are interested in being on file and we will send you form to fill out. Address American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Patents and Trade Marks

Philip V. W. Peck

Barrister Bldg., Washington, D. C.

WANTED TO BUY

WANTED—Sheet Metal Worker with job shop, pattern cutting and detailing experience, but no selling or business management experience, wishes to purchase interest in established sheet metal and heating business. Also familiar with plumbing, steam and hot water heating. Any firm wishing to increase their capital and secure services of good mechanic, please address Key 296, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

FOR SALE

SHEET METAL WORKING MACHINERY AND TOOLS

Rebuilt - Trade - In Machinery

Angle Iron Cutters	Grinders
Beading Machines	Punches
Bending Brakes	Shears
Bar Folders	Turners
Groovers	Rollers

Write for Stock List

MAPLEWOOD MACHINERY CO., Inc.
2634 Fullerton Avenue, Chicago, Ill.

FOR SALE

BLAST GATES

Write for Price List. Standard Sizes Carried in Stock for Immediate Shipment.

ALFRED GOETHEL

1910 N. Killian Pl., Milwaukee, Wis.

BALL JOINTS

BOOKS

on

AIR CONDITIONING

The two best reference books published on this important subject:

"FORCED AIR HEATING"

by

PLATTE OVERTON

Size 6x9—184 pages—136 illustrations—cloth bound.

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by

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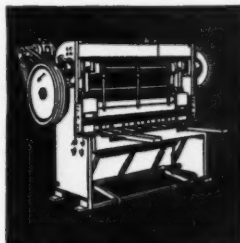
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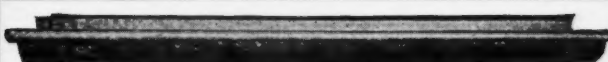
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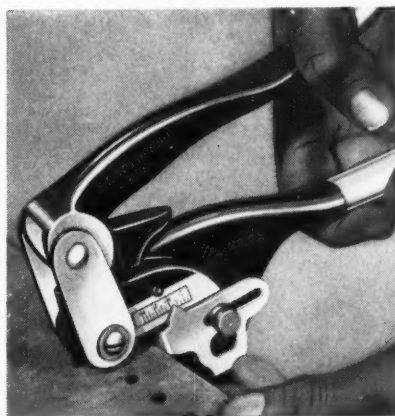
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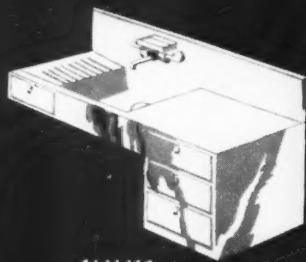
To be real money-savers screws of this type must work perfectly every time. A few "bad actors" in a box of screws may cause enough trouble and waste enough time and labor to cancel the savings made by the rest of the lot. And that's the reason why wise sheet metal workers insist on Parker-Kalon Sheet Metal Screws.

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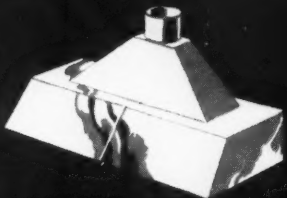


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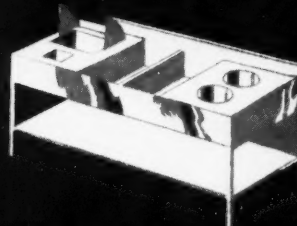
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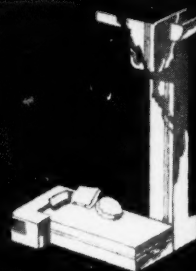
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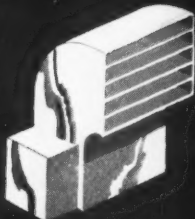
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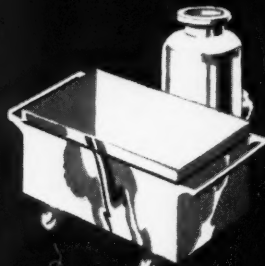
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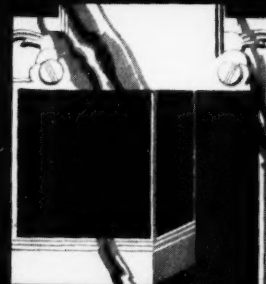
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